

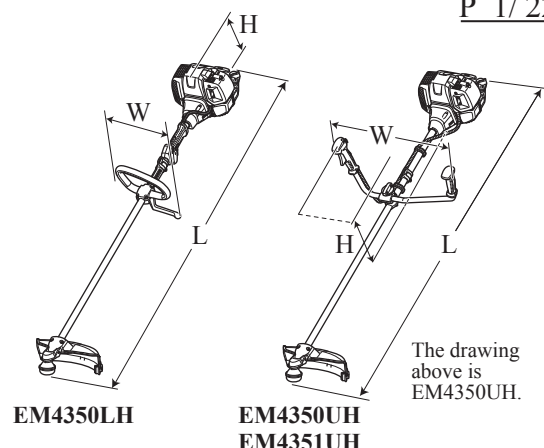
**Models No.** ▶ EM4350UH, EM4350LH  
EM4351UH

**Description** ▶ Petrol Brushcutter

## CONCEPT AND MAIN APPLICATIONS

These models are 43.0cm<sup>3</sup> 4-stroke petrol brushcutters developed in compliance with well-known exhaust emission regulations. Their main features are:

- Powerful 4-stroke engine for working in larger open area, and for easily cutting through thick weeds and longer grass
- Newly designed throttle assembly with wide-grip throttle trigger
- Universal guard for both metal blade and nylon cutting head
- Toolless quick fastening handle holder for easy handling and angle adjustment of handle (for EM4350UH, EM4351UH only)
- Floating structure with four rubber buffers absorbs vibration transmitted from engine to bike handle. (for EM4351UH only)



Dimensions: mm (")			
	EM4350UH	EM4350LH	EM4351UH
Length (L)	1,812 (71-1/2)		1,812 (71-1/2)
Width (W)	635 (25)	339 (13-3/8)	618 (24-1/4)
Height (H)	460 (18-1/8)	250 (9-7/8)	528 (20-3/4)

## ► Specification

Specifications		Model	EM4350UH	EM4350LH	EM4351UH
Engine	Type		4-stroke		
	Displacement: cm <sup>3</sup> (cu.in.)		43.0 (2.6)		
	Fuel		Straight unleaded gasoline		
	Max. output: kW (PS)		1.50 (2.1) at 7,500 rpm		
	Max. torque: N.m		2.1 at 5,500 rpm		
Max. spindle speed at no load: min. <sup>-1</sup> = rpm			7,200		
Engine oil			SAE10W-30 oil in the Class SF or higher of API Classification (Automotive 4-stroke engine oil)		
Carburetor			Diaphragm		
Engine start assist			Yes (by automatic mechanical decompression valve)		
Primer pump			Yes		
Clutch			Yes		
Fuel tank capacity: L (US oz)			0.62 (21.0)		
Spindle thread size			M10x1.25, Left-handed		
Handle style			Bike handle	Loop handle	Bike handle
Anti-vibration system			Conventional low-vibration structure		Floating structure
Net weight*1: kg (lbs)			8.3 (18.2)	7.9 (17.3)	8.6 (18.9)

\*1 Dry weight, without universal guard, cutting tool and shoulder harness

## ► Standard equipment

Blade or Nylon cutting head ..... 1  
 Universal guard (=Protector) ..... 1  
 Blade cover ..... 1 (for the model with blade)  
 Double shoulder straps with waist pad ..... 1 (for **EM4350UH**)  
 Double shoulder straps with waist pad  
     for Loop handle model..... 1 (for **EM4350LH**)  
 Double shoulder straps with waist belt ..... 1 (for **EM4351UH**)

Tool set (Hex wrench 4, Hex wrench 5,  
 Socket wrench 16-17,  
 Socket driver 16-10) ..... 1  
 Accessory bag ..... 1  
 Oil bottle without oil or  
 Oil bottle containing 100mL engine oil ..... 1

**Note:** The standard equipment for the tool shown above may vary by country.

## ► Optional accessories

255mm Triple blade, 300mm Triple blade, 255mm Star blade, 200mm Chisel blade, 225mm Chisel blade,  
 Nylon cutting heads (UltraAuto 6), Protector, Protector extension, Protector 200 set, Protector 225 set,  
 Double shoulder straps, Oil bottle

## ► Repair

**CAUTION: Repair the machine in accordance with “Instruction manual” or “Safety instructions”.**

### [1] NECESSARY REPAIRING TOOLS

Code No.	Description	Use for
1R004	Retaining ring pliers ST-2 for External ring	removing/ installing Retaining rings
1R005	Retaining ring pliers RT-2N for Internal ring	removing/ installing Cotter by using 1R389
1R006	Retaining ring pliers RT-2E for Internal ring	removing/ installing Retaining rings
1R028	Bearing setting pipe 20-12.2	press-fitting Cutter shaft set into Ball bearing 6000DDU
1R031	Bearing setting pipe 28-20.2	removing Spiral bevel gear 14 from Ball bearing 609ZZ
		press-fitting Clutch drum into Ball bearing 6004LLU/6003LLU
1R033	Bearing setting plate 10.2	removing Ball bearing 6000DDU from Cutter shaft complete
1R045	Gear extractor (Large)	removing Ball bearings
1R127	Air density tester	diagnosing Carburetor
1R247	Round bar for arbor 20-100	removing Clutch drum complete from Clutch case
1R282	Round bar for arbor 8-50	removing Spiral bevel gear 14 from Ball bearing 6000ZZ and 6000
		removing Piston pin
1R286	Round bar for arbor 12-50	press-fitting Clutch drum complete into Clutch case
1R291	Retaining ring S and R pliers	removing/ installing Retaining rings
1R364	Flywheel puller	removing Flywheel
1R366	Feeler gauge set	adjusting Ignition coil, Spark plug
1R389	Cotter removal attachment	removing/ installing Cotter by using 1R005
---	10mm Hex socket bit	removing/ installing Flywheel
---	14mm Hex socket bit	removing/ installing Clutch
---	Wire brush	cleaning Spark plug
1R219	Torque wrench shaft 7-23N.m	tightening Bolts to specified torque
1R254	Torque wrench shaft 2-6N.m	

### [2] HANDLING OF GASKET

Once Gasket is removed:

- (1) Clean up the mating surface where the gasket was installed to maintain its sealing performance.
- (2) Replace it with a new one.

### [3] LUBRICANT / ADHESIVE APPLICATION

- (1) Apply a little amount of Makita grease N No. 2 to Spiral spring in Recoil starter and the spline ends of Shaft in Shaft pipe complete.
- (2) When the inside of Gear case is cleaned, supply 11g of Makita grease N No. 2 from the grease inlet.
- (3) Apply 4g of Makita grease N No. 1 to the entire portion of Shaft in Shaft pipe complete.
- (4) Once Engine is disassembled, remove oil/grease from the mating surface of Cylinder and Crankcase complete, then apply ThreeBond 1215/1216 to the mating surface for the reassembly.

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-1. Warning

Follow the instructions described below in advance before repairing:

- Wear gloves.
- Remove the cutting tool from the unit, and if it is a saw blade, attach the blade cover to the blade.
- When the engine is hot from use, cool down the engine enough or you can get burned.
- Remove remaining fuel from Fuel tank and Carburetor completely. **[FLAMMABLE MATERIAL KEEP FIRE AWAY]**
- Remove Spark plug cap from Spark plug.
- Repair the engine on a stable workbench and in a clean workplace kept as free of dust and debris as possible.
- In order to avoid wrong reassembly, draw or write down where and how the parts are assembled, and what are the parts. It is also recommended to have boxes ready to keep disassembled parts by group.
- Handle the disassembled parts carefully. Clean and wash them properly.
- If some bolts and screws are too tight, use an impact driver.
- Tighten the bolts and the screws to the specified torque as shown in "[4]-15. Tightening torque specifications".
- Each time after you mounted a main part of the engine such as the piston, check if it moves smoothly without abnormal noise by manually turning the crankshaft.
- After completion of reassembly, check for loose parts or abnormal noise and vibration by manually turning the crankshaft.

## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-2. Engine and Shaft

- (1) Press down the tab of Cleaner plate assembly gently and separate Cleaner cover assembly from Cleaner plate assembly by loosening M5x20 Hex socket head bolt. **(Fig. 1)**
- (2) Loosen 5x16 Tapping screw and loosen Clamp that holds Bullet terminals near Cleaner plate assembly. **(Fig. 2)**
- (3) Disconnect Bullet terminals of Earth wire and Primary wire of Ignition coil from the wires of Stop switch. **(Fig. 2)**
- (4) Remove Control cable from Swivel of Carburetor; loosen the three nuts on Control cable to release the tension between Swivel and Cable bracket of Insulator, then remove the stopper on Inner cable end from Swivel. **(Fig. 3)**
- (5) For EM4351UH: Remove M5x8 Hex socket head bolt and M6x30 Hex socket head bolt in the holes of Pipe housing. **(Fig. 4)**

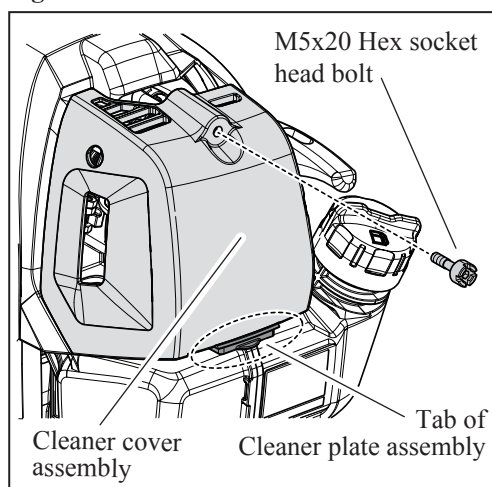
For EM4350UH and EM4350LH: Remove M5x8 Hex socket head bolt and M6x30 Hex socket head bolt from the threaded holes of Clutch case. **(Fig. 5)**

- (6) Grab Shaft pipe complete by hand, then pull it off from Clutch case.

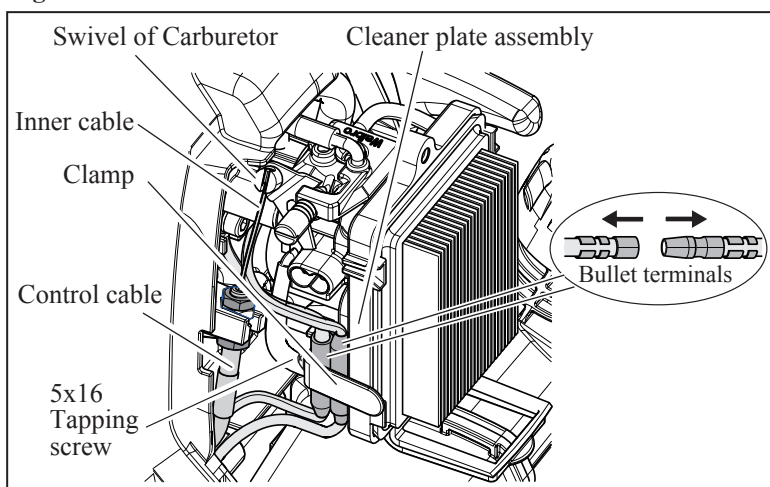
If Shaft sticks in Clutch case, use water pump pliers or the like to pull it off.

**Note:** Be sure to wrap Shaft with a rag or the like to protect it from water pump pliers. **(Fig. 6)**

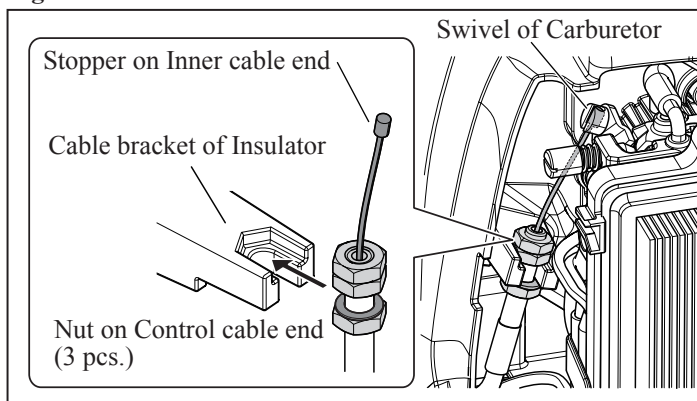
**Fig. 1**



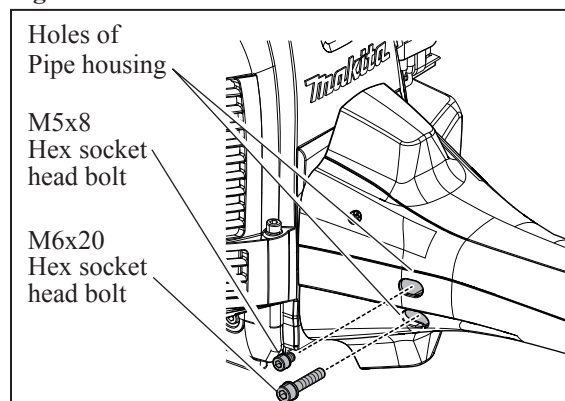
**Fig. 2**



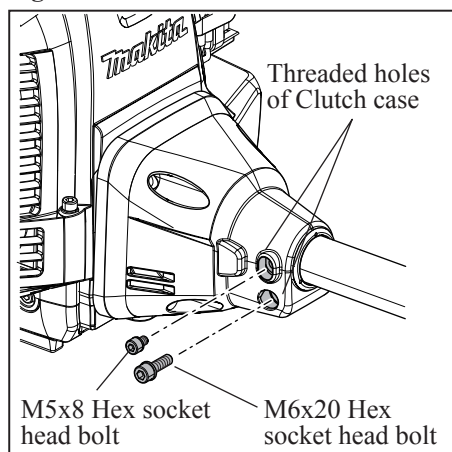
**Fig. 3**



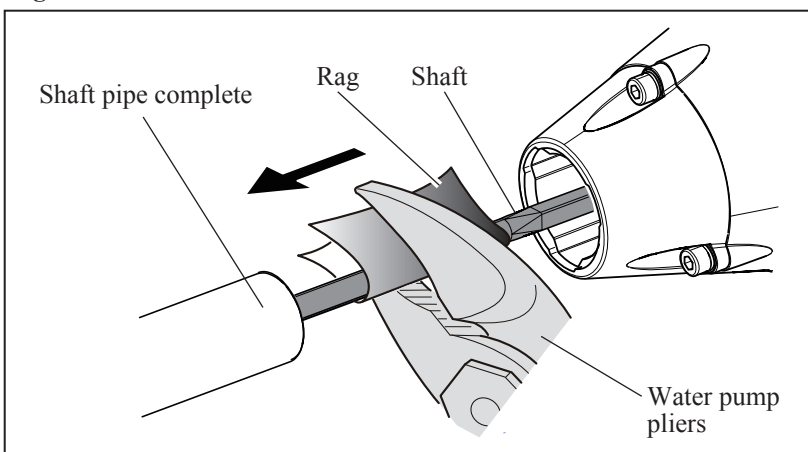
**Fig. 4**



**Fig. 5**



**Fig. 6**



## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-2. Engine and Shaft (cont.)

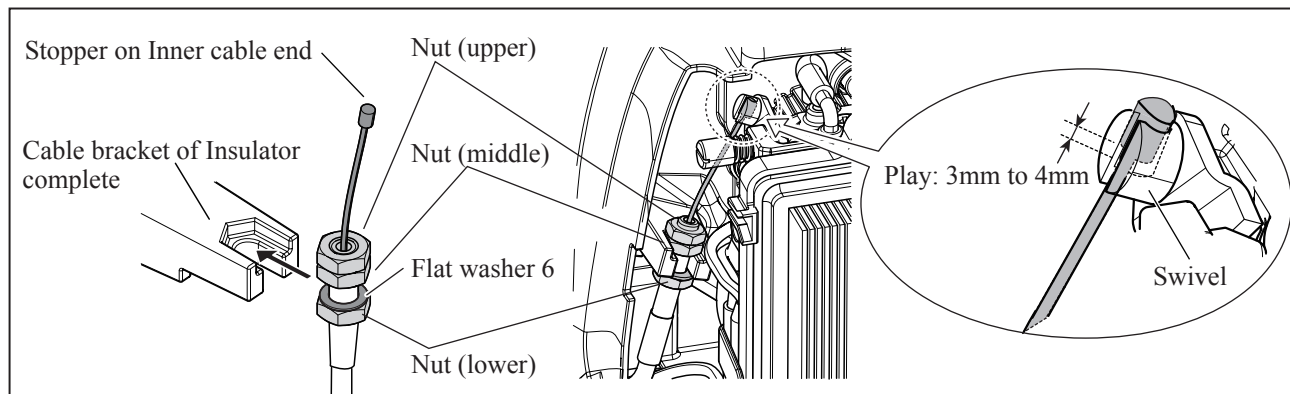
##### ASSEMBLING

Assemble by reversing the disassembly procedure.

- (1) Put Cable bracket between Flat washer 6 and middle Nut, and tighten them by turning lower nut, upper nut and the middle nut. (**Fig. 7**)
- (2) Put Stopper on Inner cable end into Swivel, then adjust the above nuts so that 3mm to 4mm of play is left inside of Swivel under condition that Throttle lever is not pulled. (**Fig. 7**)

**Note:** Adjust the tension of Inner cable to prevent the stopper from being removed . (**Fig. 7**)

**Fig. 7**

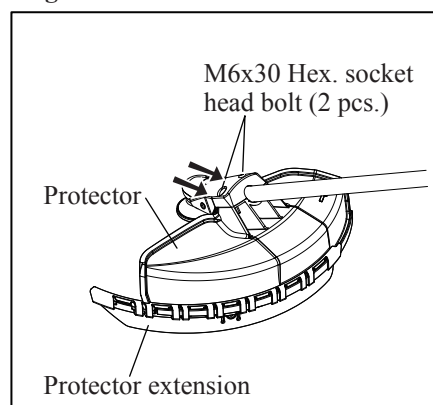


#### [4]-3. Shaft pipe complete

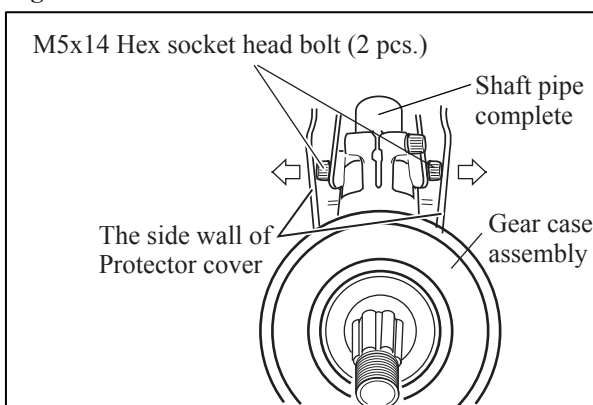
##### DISASSEMBLING

- (1) Loosen two M6x30 Hex. socket head bolt (2pcs.) and remove Protector with Protector extension attached. (**Fig. 8**)
- (2) Enlarge the space between the side wall of Protector cover and M5x14 Hex socket head bolt, and remove Protector cover from Shaft pipe complete. (**Fig. 9**)
- (3) Remove two M5x14 Hex socket head bolts then remove Protector clamp.
- (4) Loosen M6x30 Hex socket head bolt then remove Gear case assembly. (**Fig. 10**)

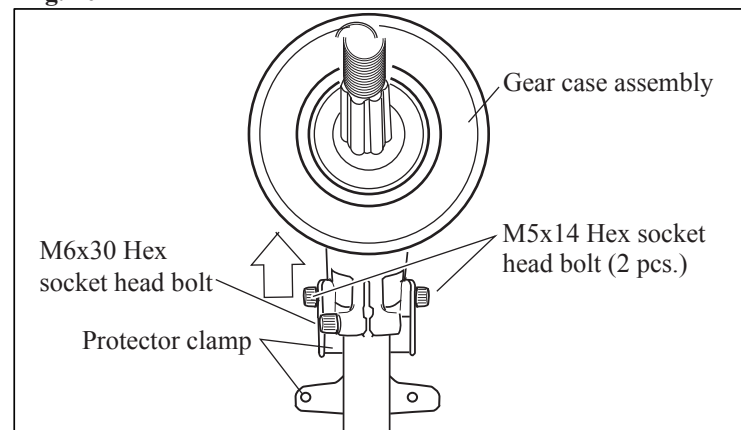
**Fig. 8**



**Fig. 9**



**Fig. 10**





## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-3. Shaft pipe complete (cont.)

##### DISASSEMBLING

For 4351UH:

(5A) Loosen M5x18 Hex socket head bolt and remove Shaft pipe complete from Pipe housing. (**Fig. 11**)

(6A) Pull out Shaft from Shaft pipe complete.

For 4350UH:

(5B) Remove two M6x25 Hex socket head bolts and Pipe clamp, then separate Bike handle section from Shaft pipe complete. (**Fig. 12**)

(6B) Remove the following parts from Shaft pipe complete.

- Wire clamp (2 pcs.) • Hanger set • Shaft (**Fig. 13**)

For 4350LH:

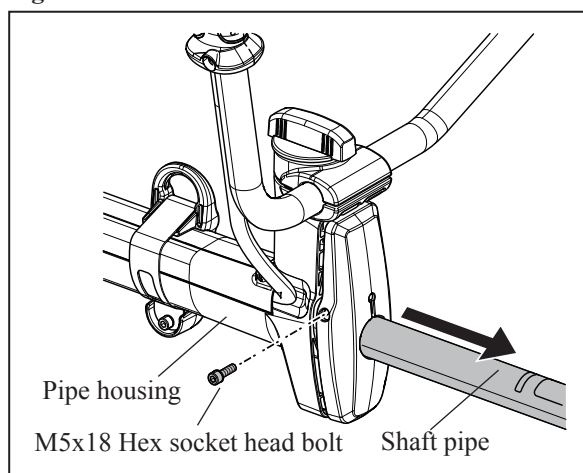
(5C) Remove four M5x30 Hex socket head screws, then remove Handle clamp 28 and then remove Loop handle 28. (**Fig. 14**)

(6C) Loosen two M5x14 Hex socket head bolts, then separate Lever case set from Pipe shaft complete. (**Fig. 15**)

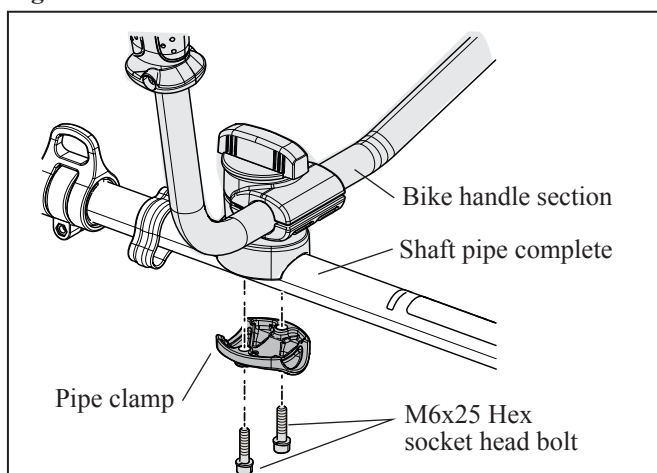
(7C) Remove the following parts from Pipe shaft complete.

- Hanger set • Spacer • Shaft

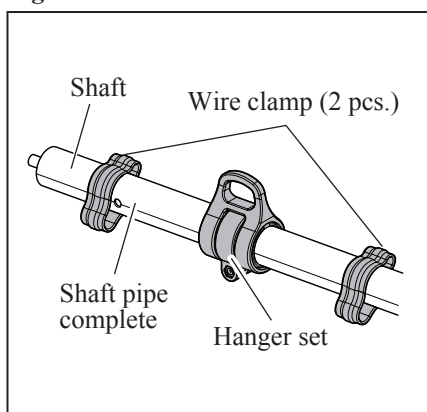
**Fig. 11**



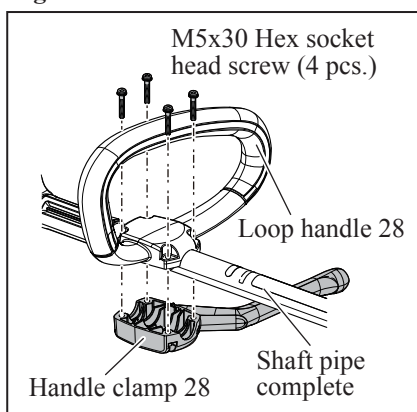
**Fig. 12**



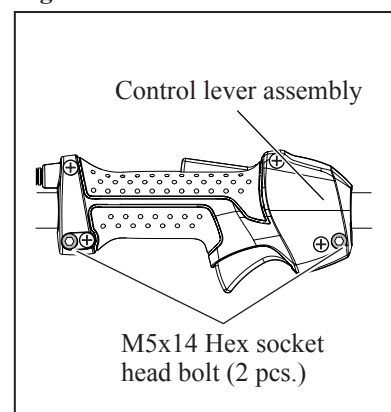
**Fig. 13**



**Fig. 14**



**Fig. 15**



## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-3. Shaft pipe complete (cont.)

##### ASSEMBLING

For 4351UH:

(1A) Insert Buffer rubber into Pipe housing so as to align the two grooves with the two ribs (**Fig. 16**) Set the four Buffer rubbers in place of Pipe housing. (**Fig. 17**)

(2A) Insert two projections of Clutch case into Buffer rubbers. Insert two projections of Housing holder into the other Buffer rubbers, then tighten M5x18 Hex socket head bolt while holding Housing holder by hand. (**Fig. 17**)

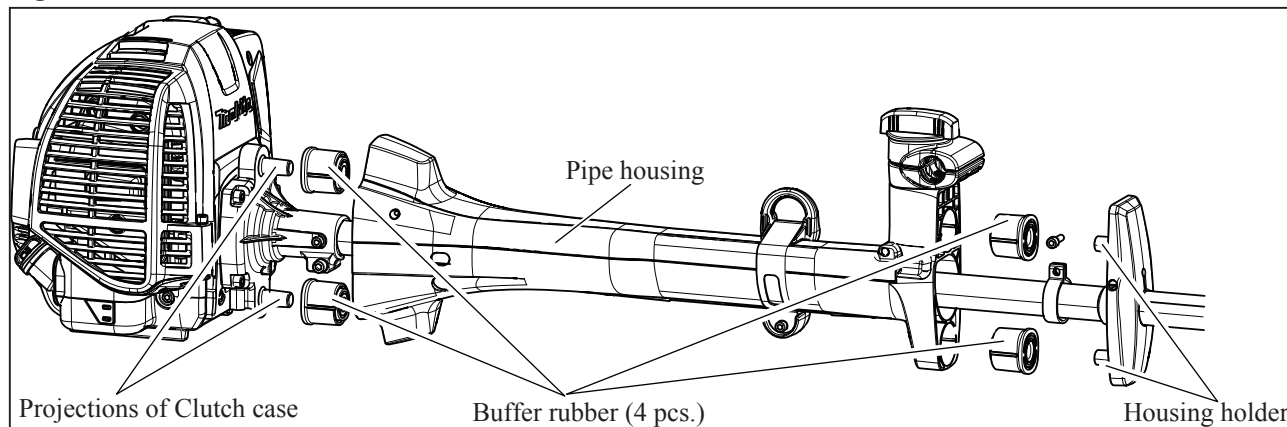
**Note:** Make sure that Corrugate tube is put in the groove of Pipe housing. (**Fig. 18**)

(3A) Assemble by reversing the disassembly procedure.

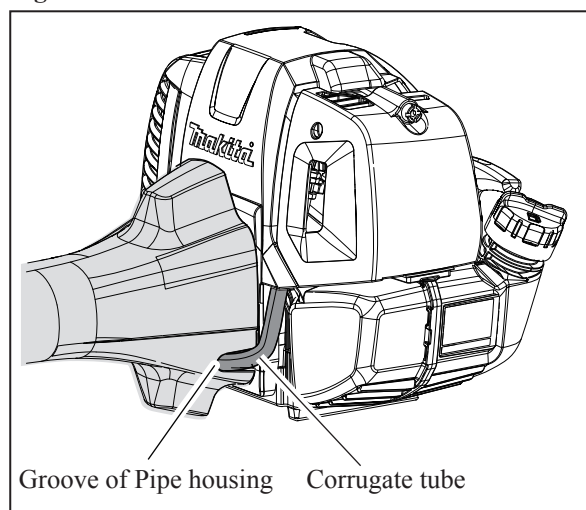
For 4350UH and 4350LH:

Assemble by reversing the disassembly procedure.

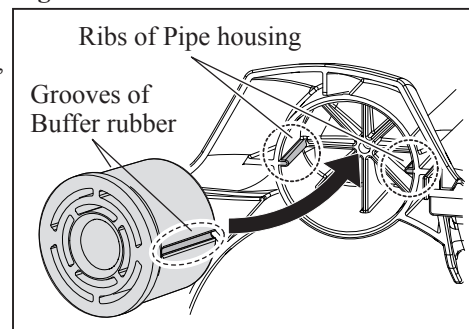
**Fig. 17**



**Fig. 18**



**Fig. 16**



## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

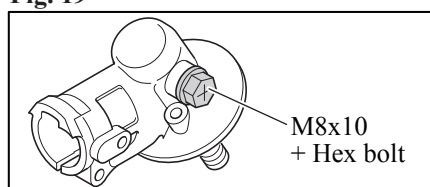
#### [4]-4. Gear case assembly

##### DISASSEMBLING

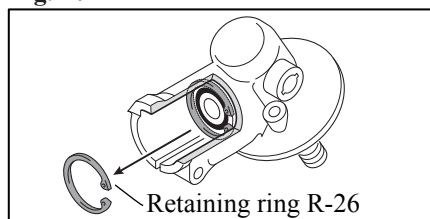
- (1) According to the clause of [4]-3, Remove Gear case assembly. (Refer to **Figs. 8, 9 and 10**)
  - (2) Remove M8x10 + Hex bolt from the grease inlet of Gear case assembly. (**Fig. 19**)
  - (3) Remove Retaining ring R-26 with 1R006. (**Fig. 20**)
  - (4) Remove an assembled part of Spiral bevel gear 13\*, Ball bearing 6000ZZ, Ball bearing 6000 and Retaining ring S-10 by tapping Gear case assembly with Plastic hammer. (**Fig. 21**)
- Note:** If the assembled part cannot be removed, use a heat gun or hair dryer to warm Gear case assembly.
- (5) Remove Retaining ring S-10 with 1R291. (**Fig. 21**)
  - (6) Receive Ball bearing 6000 with 1R031, then press down the shaft end of Spiral bevel gear 13 using 1R282 with Arbor press. (**Fig. 22**) Refer to **Fig. 23** for the components.
  - (7) Remove Retaining ring R-32 with 1R291. (**Fig. 24**)
  - (8) Preset Receive washer and 1R033 with M10-17 Hex nut to Cutter shaft complete\* as drawn in **Fig. 25**, and give the impacts using the plastic hammer. An assembled part of Cutter shaft complete\* and Ball bearing 6201LLU is removed. Refer to **Fig. 26** for the components.
  - (9) Remove Ball bearing 6201LLU with 1R045.

\*Neither Spiral bevel gear 13 or Cutter shaft set is supplied individually. It is supplied as a set "Cutter shaft set".

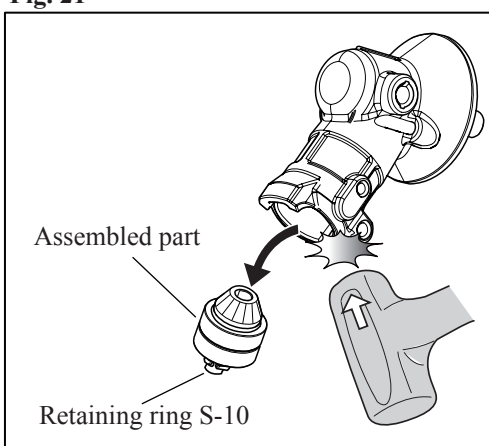
**Fig. 19**



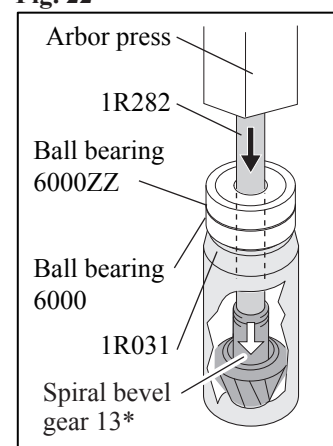
**Fig. 20**



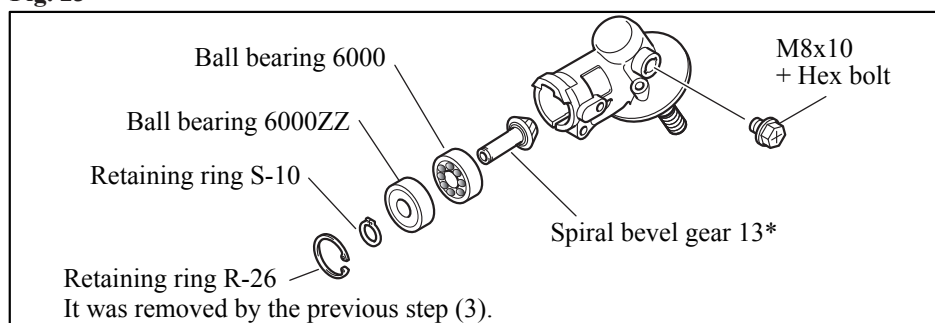
**Fig. 21**



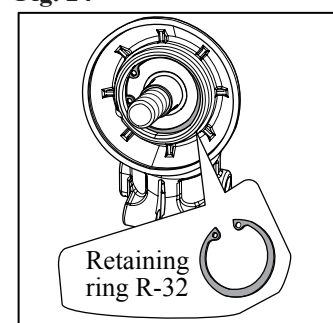
**Fig. 22**



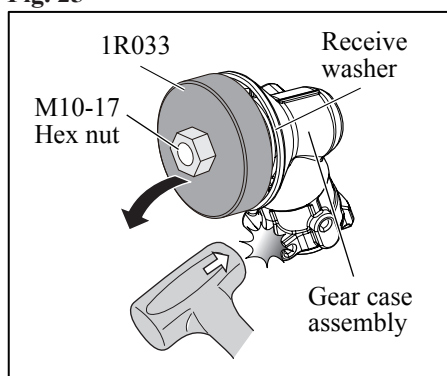
**Fig. 23**



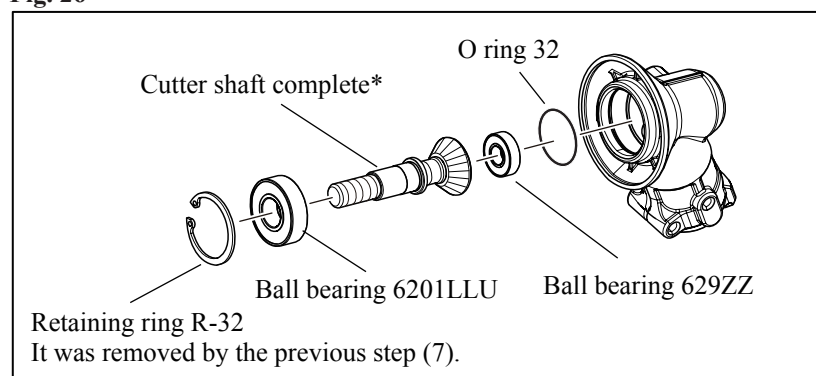
**Fig. 24**



**Fig. 25**



**Fig. 26**



## Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-4. Gear case assembly (cont.)

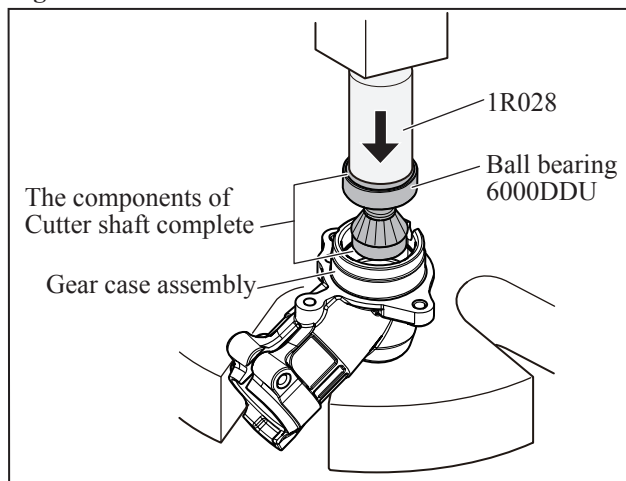
##### ASSEMBLING

Assemble by reversing the disassembly procedure.

##### Note:

- Make sure that O ring 32 is put into the inner groove of Gear case assembly in advance.
- When mounting Cutter shaft complete into Gear case assembly, press-fit them together using arbor press and 1R028 as shown in **Fig. 27**.

**Fig. 27**



#### [4]-5. Clutch shoe

##### DISASSEMBLING

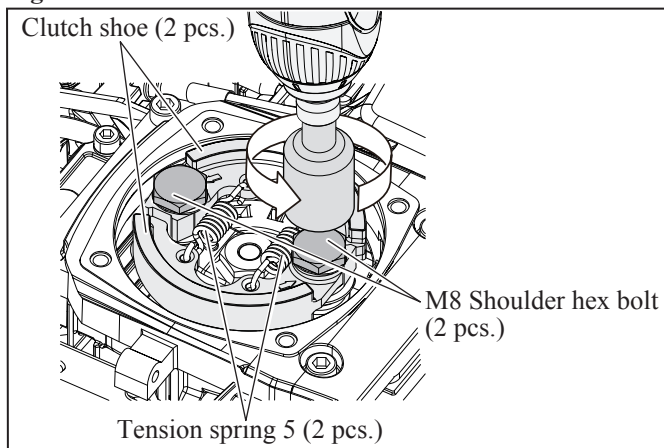
**Warning: Remove Spark plug cap from Spark plug to prevent accidental engine starting.**

**Note:** Clutch can be easily removed with a cordless impact driver without locking Piston, because it is locked in a position due to the compressed air resistance in Cylinder.

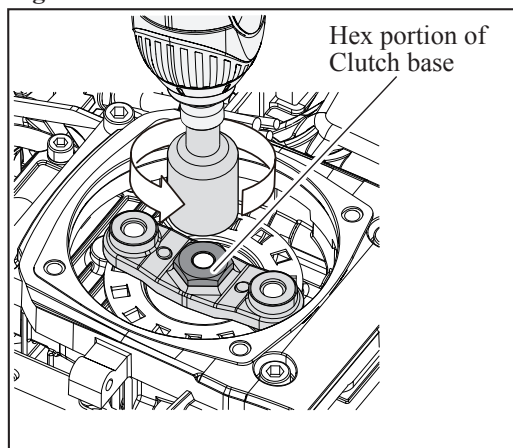
Therefore, do not remove Spark plug, or the air in Cylinder cannot be compressed.

- (1) Remove two Clutch shoes and Tension springs 5 by loosening each M8 Shoulder hex bolt counterclockwise. (**Fig. 28**)
- (2) Remove Clutch base by turning the hex portion counterclockwise. (**Fig. 29**)

**Fig. 28**



**Fig. 29**



##### ASSEMBLING

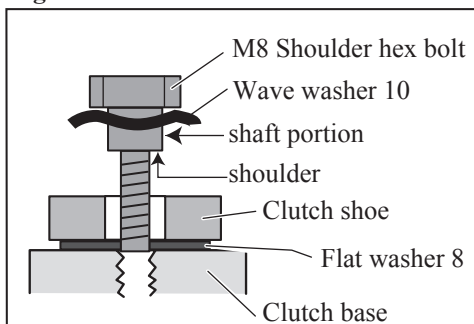
- (1) Set Clutch base in place by turning the hex portion clockwise.
- (2) Set two Clutch shoes and Tension springs 5 in place by tightening each M8 Shoulder hex bolt clockwise; first by hand, then with a cordless impact driver\*

\*This is because the M8 Shoulder hex bolt is a shoulder bolt. Therefore, tighten by hand until the shoulder of the shaft portion contacts the upper end surface of Clutch shoe, then tighten fully with a cordless impact driver. (**Fig. 30**)

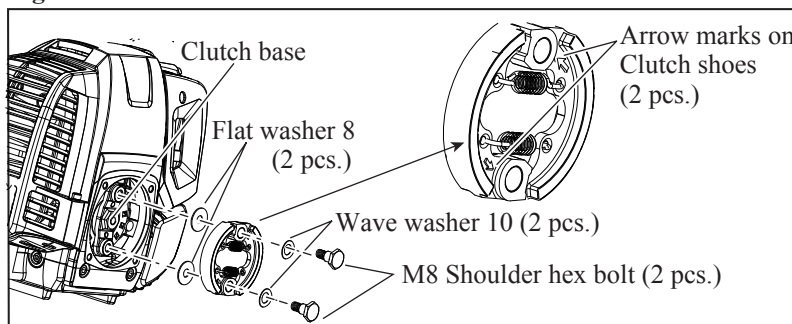
##### Note:

- Face the arrow marks on Clutch shoes toward the upper side. (**Fig. 31**)
  - Put Clutch shoe between Wave washer 10 and Flat washer 8, then tighten M8 Shoulder hex bolt.
- Refer to **Figs. 30 and 31**.

**Fig. 30**



**Fig. 31**





## Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-6. Clutch drum

##### DISASSEMBLING

For 4351UH: Refer to Parts breakdown in **Fig. 35**.

(1A) Remove four M6x20 Hex socket head bolts, then separate Clutch case from Engine. (**Fig. 33**)

(2A) Remove Retaining ring (INT) R-42 in Clutch case with 1R006. (**Fig. 33**)

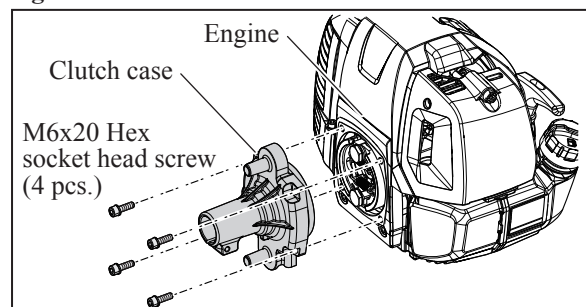
(3A) Put 1R247 on Clutch drum in Clutch case, press down Clutch drum using Arbor press. (**Fig. 34**)

**Note:** If it is difficult to remove Clutch drum from Clutch case, warm Clutch case with a heat gun.

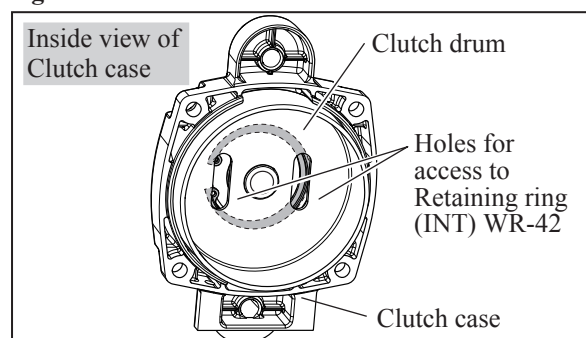
(4A) Remove Retaining ring (EXT) WR-20 from Clutch drum with 1R004.

(5A) Remove Ball bearing 6004LLU from Clutch drum with 1R045.

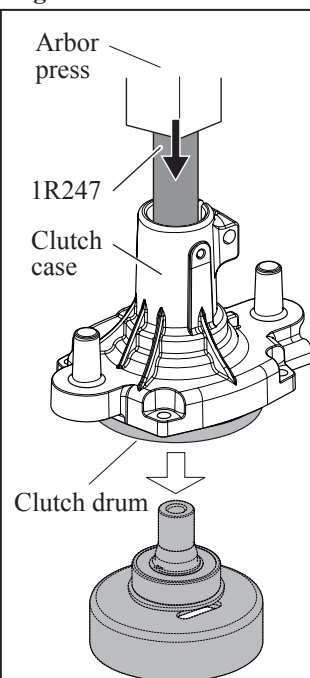
**Fig. 32**



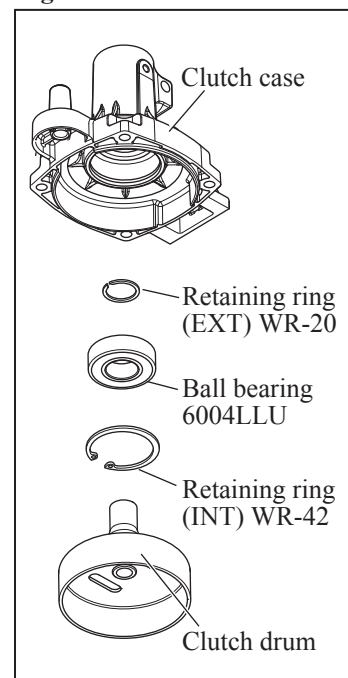
**Fig. 33**



**Fig. 34**



**Fig. 35**



For 4350UH and 4350LH: Refer to Parts breakdown in **Fig. 39**.

(1B) Remove four M6x20 Hex socket head bolts, then separate Clutch case from Engine. (**Fig. 36**)

(2B) Remove three M5x20 Hex socket head bolts, then separate Pipe retainer from Clutch case. (**Fig. 36**)

(3B) Remove Retaining ring R-35 in Clutch case with 1R006. (**Fig. 37**)

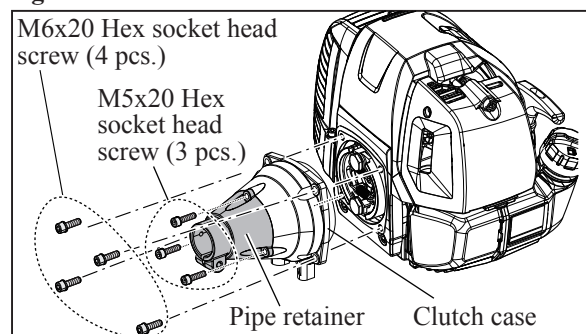
(3B) Put 1R247 on Clutch drum in Clutch case, press down Clutch drum using Arbor press. (**Fig. 38**)

**Note:** If it is difficult to remove Clutch drum from Clutch case, warm Clutch case with a heat gun.

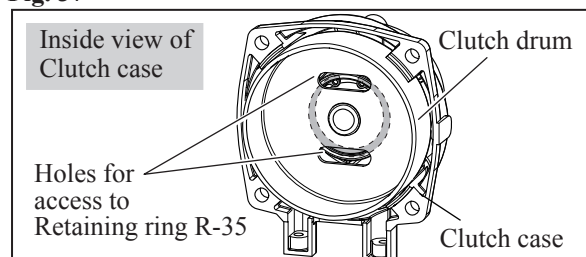
(4B) Remove Retaining ring S-17 from Clutch drum with 1R004.

(5B) Remove Ball bearing 6003LLU from Clutch drum with 1R045.

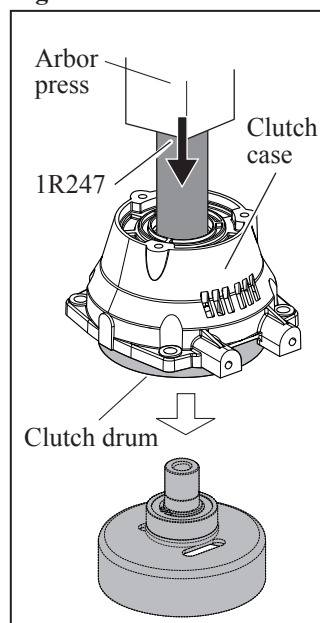
**Fig. 36**



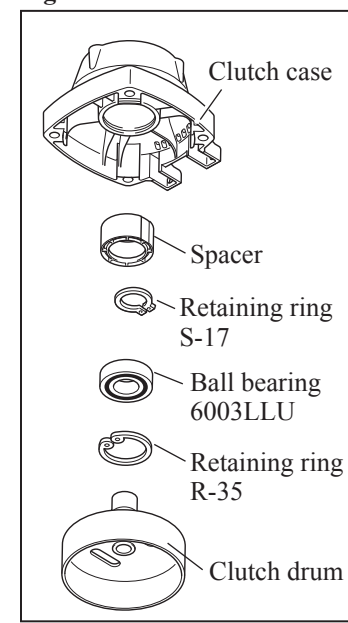
**Fig. 37**



**Fig. 38**



**Fig. 39**





## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-6. Clutch drum (cont.)

##### ASSEMBLING

##### For 4351UH:

(1) Press-fit Ball bearing 6004LLU to Clutch drum with 1R031 in **Fig. 40**.

**Note:** Put Retaining ring (INT) R-42 between Ball bearing 6004LLU and Clutch drum in advance.

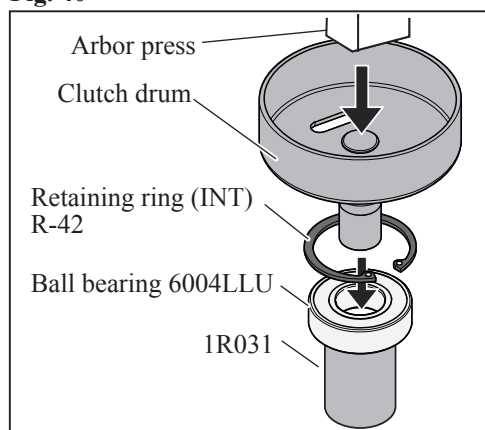
(2) Set Retaining ring (EXT) WR-20 in the groove on Clutch drum.

(3) Put Clutch case on the table of Arbor press horizontally without tilt, and press-fit Clutch drum into Clutch case with 1R286. (**Fig. 41**)

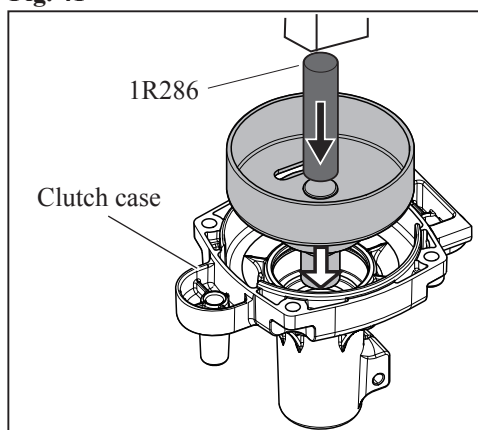
(4) Set Retaining ring (INT) R-42 to the inner groove of Clutch case.

(5) Assemble by reversing the disassembly procedure.

**Fig. 40**



**Fig. 41**



##### For 4350LH and 4350UH:

(1) Press-fit Ball bearing 6003LLU to Clutch drum with 1R031 in **Fig. 42**.

**Note:** Put Retaining ring R-35 between Ball bearing 6003LLU and Clutch drum in advance.

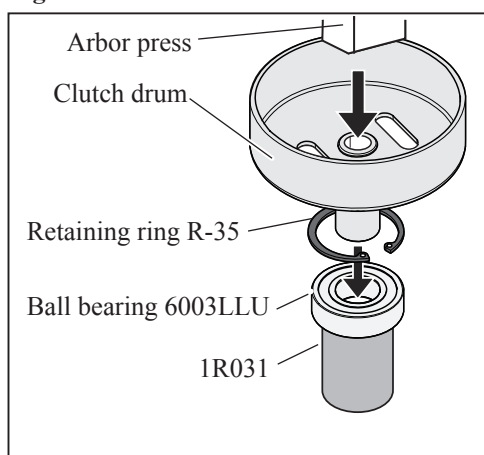
(2) Set Retaining ring S-17 in the groove on Clutch drum.

(3) Put Clutch case on the table of Arbor press horizontally without tilt, and press-fit Spacer and Clutch drum into Clutch case with 1R286. (**Fig. 43**)

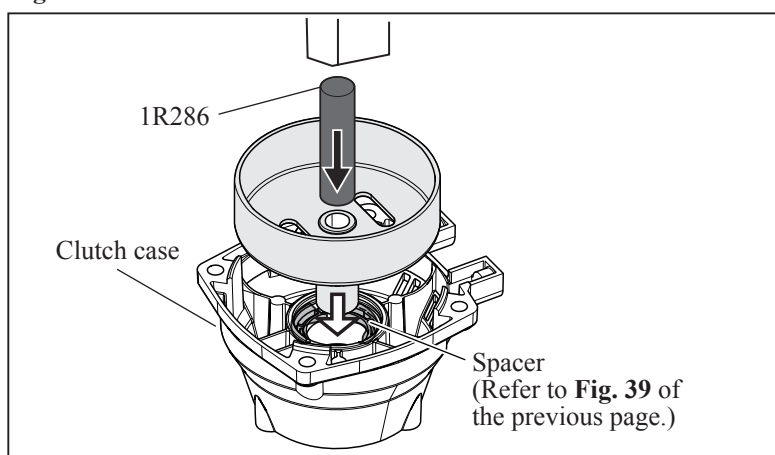
(4) Set Retaining ring R-35 to the inner groove of Clutch case.

(5) Assemble by reversing the disassembly procedure.

**Fig. 42**



**Fig. 43**



## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

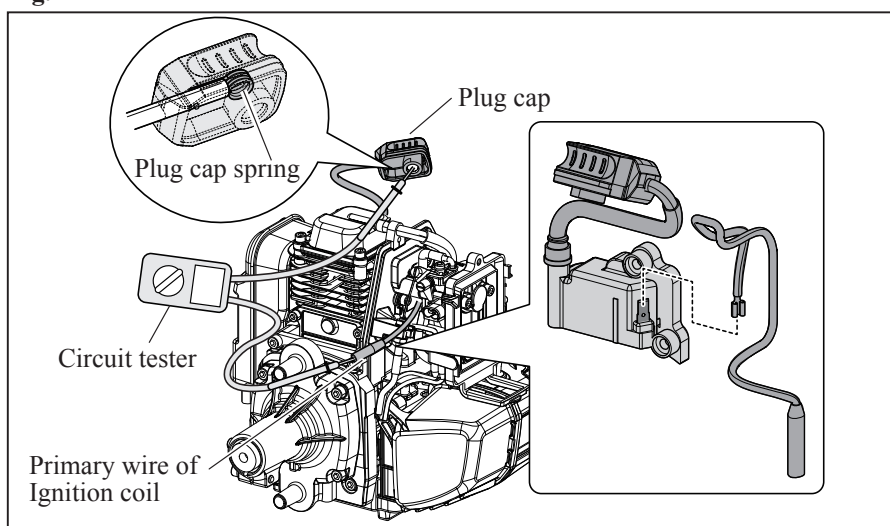
#### [4]-7. Ignition system

##### CHECKING PLUG CAP

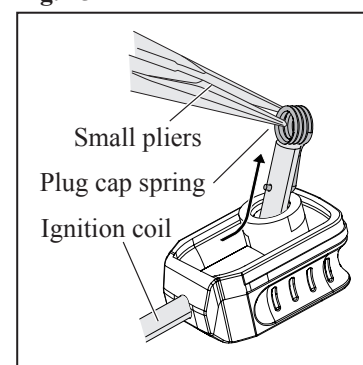
- (1) Remove Plug cap from Spark plug, then check the continuity between Plug cap spring and the ground (earth) terminal of Ignition coil with a circuit tester. If there is normal continuity, the resistance value will be  $2.0k\Omega \pm 0.5k\Omega$ . (Fig. 44)
- (2) If there is no or intermittent continuity, check the continuity between Ignition cable and Plug cap spring by following the procedure described below.
  1. Apply spray lubricant in Plug cap, then pull out Plug cap spring together with Ignition cable from Plug cap using small pliers. (Fig. 45)
  2. Check if Plug cap spring is properly connected to Ignition cable. If not, connect them properly. Also check Plug cap for any crack. If Plug cap is cracked, replace it with a new one.
  3. Insert Plug cap spring in the center of Ignition cable. Then using small pliers, put them back into Plug cap while taking care not to disconnect Plug cap spring from Ignition cable.
  4. Make sure that Plug cap spring is firmly connected to Ignition cable by doing the same as you did in step (1) with a circuit tester.

**Note:** Poor continuity between Plug spring cap and Ignition cable will result in no or weak spark.

**Fig. 44**



**Fig. 45**



##### CHECKING SPARK PLUG

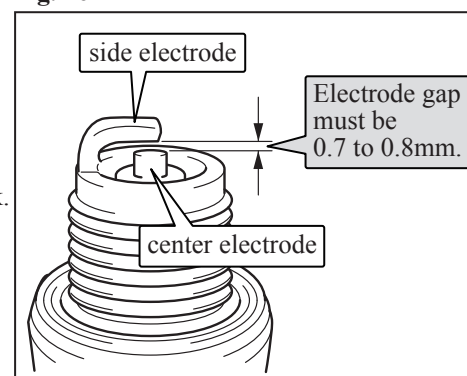
###### WARNING !!

- When a spark is produced, high-voltage current is delivered from Ignition coil to Spark plug. It is, therefore, very dangerous to pull Recoil starter knob with your hand on Ignition cable. Be sure to keep your hands off from Ignition cable when checking for spark.
- Fuel is extremely flammable and fuel vapors are explosive. Therefore, clean up spilled fuel before starting to check for spark. Also, be careful not to do the check near Carburetor.

- (1) Remove Plug cap from Spark plug, then Spark plug from Cylinder with the supplied socket wrench.
- Note:** If the electrodes of Spark plug are wet, wipe them with a rag then dry them with an air blower.
- (2) Using a wire brush, carefully clean up carbon deposits (if any) from the electrodes and the ceramic insulator around the center electrode.
- (3) Adjust the electrode gap to 0.7 to 0.8mm by carefully bending the side electrode. Use Feeler gauge set (1R366) to check the gap width: between the center electrode and the side electrode, insert 0.8mm leaf of Feeler gauge set. (Fig. 45)

- (4) Install another Spark plug into spark plug hole to prevent air/fuel mixture from leaking outside of engine.
- (5) Connect the removed Spark plug with Plug cap, then ground the threads of Spark plug to a proper metal part of the engine.
- (6) With Stop switch on, pull Recoil starter knob gently and check for spark.
- Note:**
  - It is hard to see the spark in a bright location. Therefore, be sure to do the check in a shady but well-ventilated place.
  - Sparks do not happen at without exceeding 500 rpm.
- (7) If spark is not produced, replace Spark plug with a new one, then check for spark by following the procedure (1) to (6) once again.

**Fig. 46**



## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-7. Ignition system (cont.)

##### REMOVING IGNITION COIL

- (1) Before removing Ignition coil, separate Cylinder cover from Engine, and pull out Primary wire from Ignition coil in advance. (Fig. 47)
- (2) Remove two M4x20 Hex socket head bolts and Ignition coil from Engine. (Fig. 47)

**Note:** Be careful to the torque to loosen the bolts because adhesive is applied on the threads under our quality control.  
Once removing their bolts, do not fail to apply adhesive to the threads.

##### MOUNTING IGNITION COIL

- (1) Insert 0.3mm leaf of 1R366 between Ignition coil and the magnet of Flywheel. (Fig. 48)  
Ignition coil will be attracted to the magnet through 1R366. Then, without removing 1R366, fasten Ignition coil to Engine with two M4x20 Socket head bolts. (Fig. 47)
- (2) Remove 1R366. Then make sure that Flywheel does not touch Ignition coil by turning it by hand.

Fig. 47

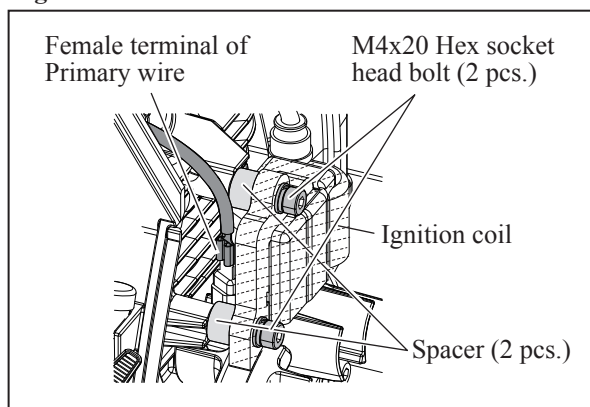


Fig. 48

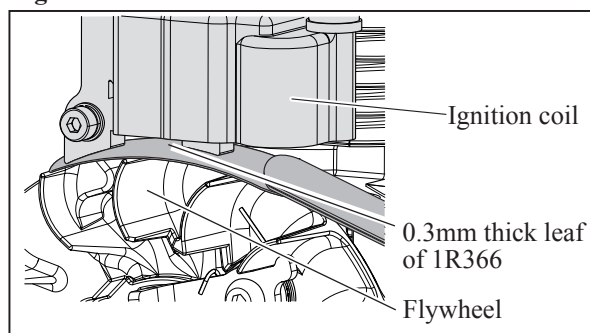


Fig. 49

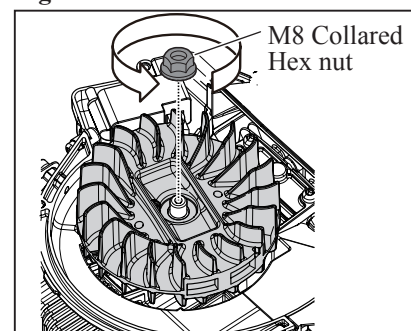


Fig. 50

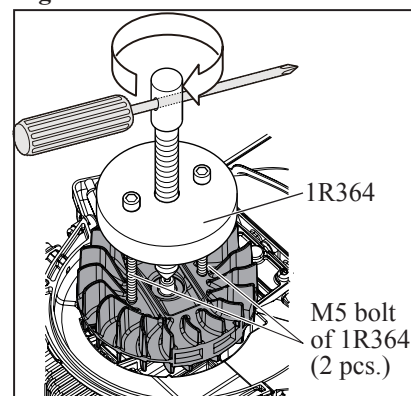
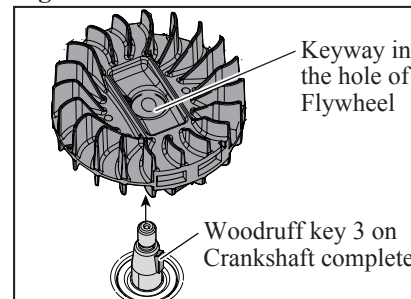


Fig. 51



#### [4]-8. Flywheel

**Warning:** Remove Spark plug cap from Spark plug to prevent accidental engine starting.

**Note:** Flywheel can be easily removed with a cordless impact driver without using any locking tool, because Piston is locked in a position due to the compressed air resistance in Cylinder.  
Therefore, do not remove Spark plug, or the air in Cylinder cannot be compressed.

##### DISASSEMBLING

- (1) Turn M8 Collared Hex nut in the center of Flywheel counterclockwise using a cordless impact driver. (Fig. 49)
- (2) Mount 1R364 on Flywheel, then screw two M5 bolts of 1R364 into Flywheel as drawn in Fig. 50.

Flywheel can now be removed from Crankshaft complete by turning the center bolt of 1R364 clockwise using a screwdriver or the like.

**Important:** Screw two M5 bolts evenly.

##### ASSEMBLING

- (1) Wipe off grease and oil from Crankshaft complete.
- (2) Aligning the key way of Crankshaft complete with Woodruff key 3 on Flywheel, install Flywheel onto Crankshaft complete. (Fig. 51)
- (3) Screw M8 Collared Hex nut to Crankshaft complete by turning it clockwise by hand.
- (4) Tighten M8 Collared Hex nut firmly using an impact driver.

## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-9. Recoil starter

##### DISASSEMBLING

- (1) Remove Starter cover assembly by loosening four M5x20 Hex socket head bolts. (**Fig. 52**)
- (2) Pull Starter rope out of Starter cover assembly approximately one winding long. Then hook Starter rope on the U-shaped notch of Reel, and then turn Reel clockwise until Spiral spring is unwound. (**Fig. 53**)

**Note:** Be careful with Reel because it will turn very fast.

- (3) Remove Reel from Starter cover by loosening 5x10 Tapping screw.

**Note:** Be careful with Spiral spring that can suddenly pop out of Starter cover.

- (4) Unite the knot of Starter rope to remove the rope from Reel.

##### ASSEMBLING

- (1) If Spiral spring has popped out of Reel, put it back in place; hook the outer end of Spiral spring onto the spring hook of Reel first, then by winding Spiral spring counterclockwise towards the center of Reel. (**Fig. 54**)
- (2) Apply a little amount of Makita grease N No.2 to the whole surface of Spiral spring.

- (3) Put a new Starter rope through Starter cover. Then tie one end to Starter knob and the other to Reel by making a knot. (**Fig. 55**)

- (4) Make sure that the inner end of Spiral spring is positioned close to the shaft portion of Starter cover for the step (6). Then put Reel in Starter cover.
- (5) Wind Starter rope around Reel two or three times.
- (6) While turning Reel counterclockwise, mount it in Starter cover. The inner end of Spiral spring will be engaged with the spring hook of Shaft portion in Starter cover by the counterclockwise rotation of Reel. (**Figs. 54 and 55**)

**Note:** You do not need force to mount Reel in place.

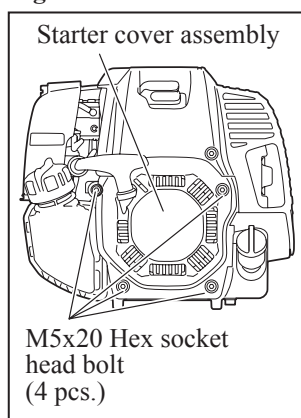
- (7) Fasten Reel to the shaft portion of Starter cover with M6x20 Set screw. (**Fig. 56**)

**Note:** Reel is not properly set in place if the rotation of Reel is slow after the screw is fastened.

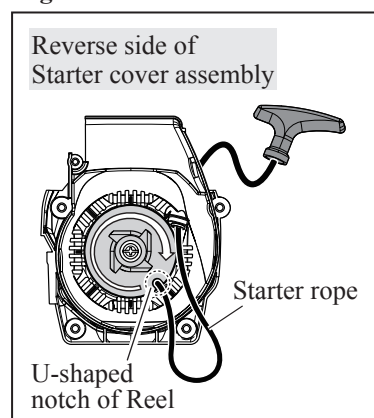
In this case, repeat steps (5) and (6) until normal rotation of Reel is obtained.

- (7) Hook Starter rope on the U-shaped notch of Reel. Then, while pulling Starter rope, turn Reel counterclockwise. (**Fig. 57**) Release Starter rope from the U-shaped notch and Starter rope will be wound around Reel due to the rotational force of Spiral spring. Repeat this operation until the slack is completely removed from Starter rope.

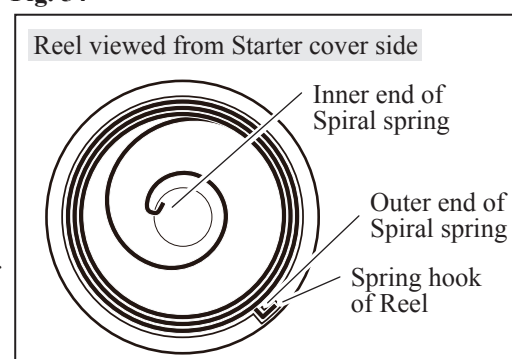
**Fig. 52**



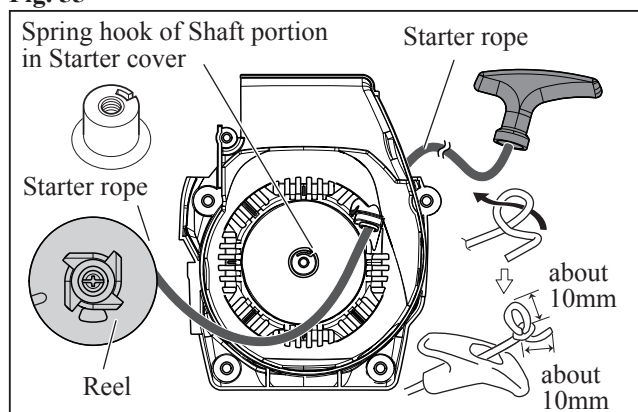
**Fig. 53**



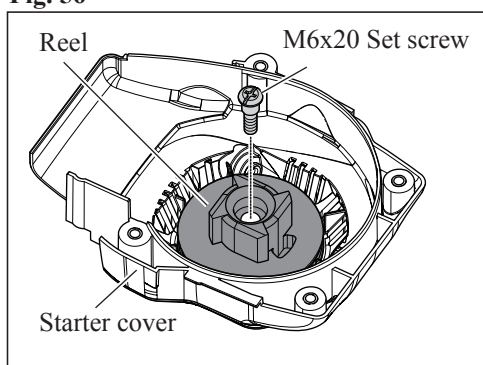
**Fig. 54**



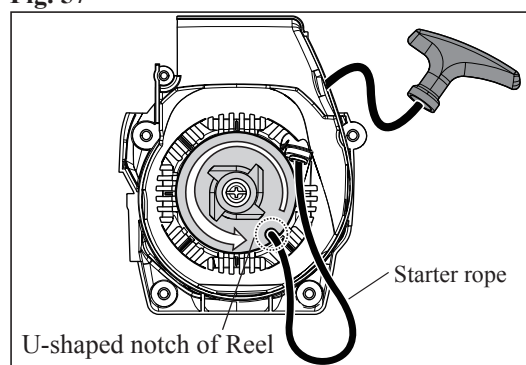
**Fig. 55**



**Fig. 56**



**Fig. 57**





## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-10. Carburetor section

##### DISASSEMBLING

- (1) Press down the tab of Cleaner plate assembly gently and separate Air cleaner cover from Cleaner plate assembly by loosening M5x20 Hex socket button head screw. (**Fig. 1 of [4]-2.**)
  - (2) Remove Air cleaner element. (**Fig. 58**)
  - (3) Remove two M5x60 Hex socket head bolts that fasten Carburetor assembly and Cleaner plate assembly to Insulator complete. (**Fig. 59**)
- Note:** Remove the bolts completely, or Carburetor cannot be removed from Insulator complete.
- (4) Remove three tubes from Carburetor assembly, then separate Carburetor assembly from Engine.

Fig. 58

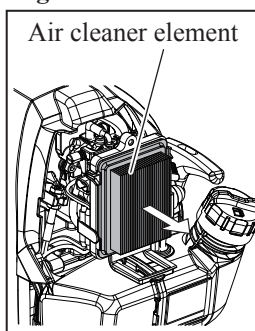
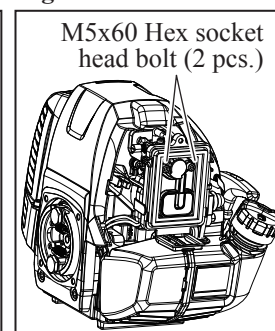


Fig. 59



##### DISASSEMBLING/ CLEANING CARBURETOR

- (1) Remove four Pan head screws, then separate Metering cover, Metering diaphragm and Metering diaphragm gasket from Carburetor. (**Fig. 60**)
- Note:** If Metering diaphragm gasket is sticking on the adjacent part, remove it with care because it is easily broken.
- (2) Check Metering diaphragm for shrinkage, hardening or breakage due to aged deterioration. If any, replace it with a new one.
  - (3) The inner parts of Pump body assembly can be removed by separating the pan head screw designated in **Fig. 61**.
  - (4) Before mounting the inner parts of Pump body assembly in place, make sure that the tip of Inlet needle is neither worn nor deformed. (**Fig. 62**)
- Note:** The inner parts are not available individually. If you need any of the inner parts, order Pump body assembly.
- (5) When mounting Control lever, make sure that the upper end of Spring is firmly held in place under the projection of Control lever. (**Fig. 63**)
  - (6) Remove the pan head screw of Pump cover. (**Fig. 64**)
  - (7) Make sure that Inlet screen is not clogged, then set it back in place. (**Fig. 65**)
  - (8) Spray Carburetor cleaner in all the fuel lines of Carburetor, then after several minutes, wash out dirt and debris with clean gasoline.

Fig. 60

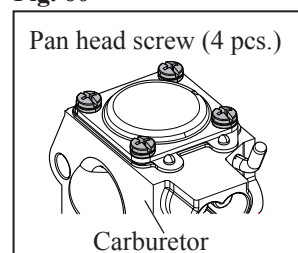


Fig. 61

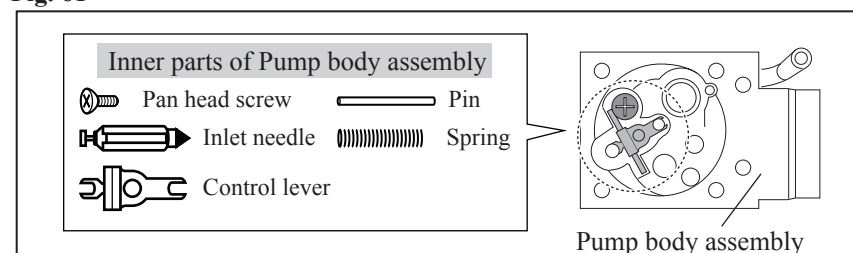


Fig. 62

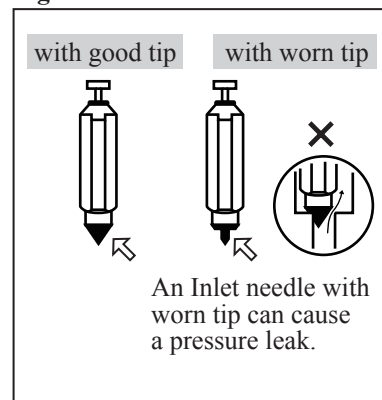


Fig. 63

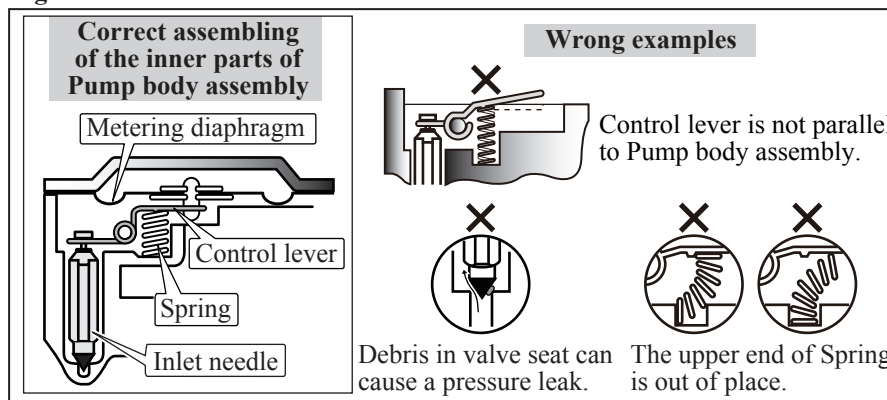


Fig. 64

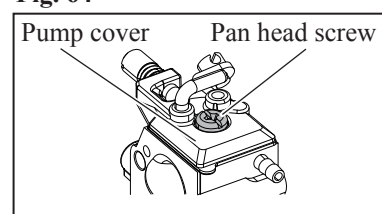
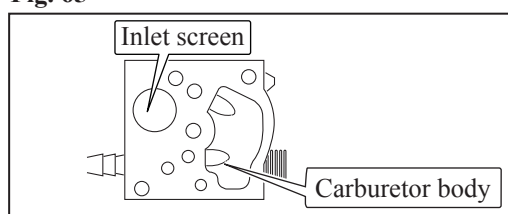


Fig. 65





## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-10. Carburetor section (cont.)

##### ASSEMBLING CARBURETOR

Assemble by reversing the disassembly procedure.

**Note:** Make sure that the assembling direction of each part is correct.

##### VACUUM LEAK TEST OF CARBURETOR

Connect 1R127 with the fuel inlet of Carburetor, then increase the testing pressure up to 0.05Mpa. The pressure will stay the same about 10 seconds if there is no vacuum leak. (Fig. 66)

##### MOUNTING CARBURETOR

- (1) Fasten the following parts to Cylinder block assembly with two M5x60 Pan head screws. (Fig. 67)  
Carburetor gasket (2 pcs: small and large) , Carburetor, Cleaner plate assembly, Insulator complete
- (2) Connect three Tubes to Carburetor as drawn in Fig. 68.  
Then connect Tube 5-160 and Pipe to Cleaner plate assembly as drawn in Fig. 69.
- (3) Mount Air cleaner element onto Cleaner plate assembly.
- (4) Mount Air cleaner cover complete onto Air cleaner plate, then secure with M5x20 Hex socket head bolt. (Fig. 1 of [4]-2.)

**Note:** Be sure to fit the tab of Cleaner plate assembly into the slot of Cleaner cover assembly.

Fig. 67

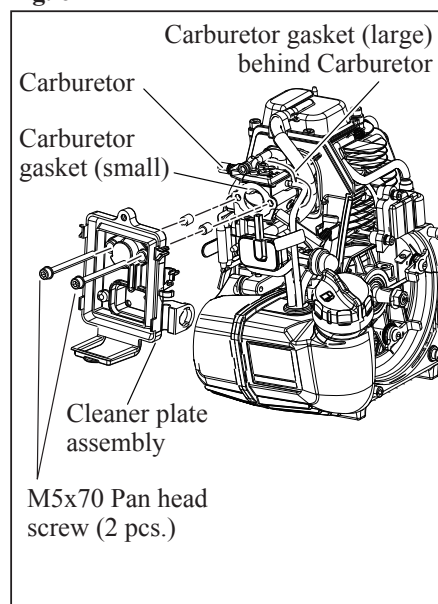


Fig. 68

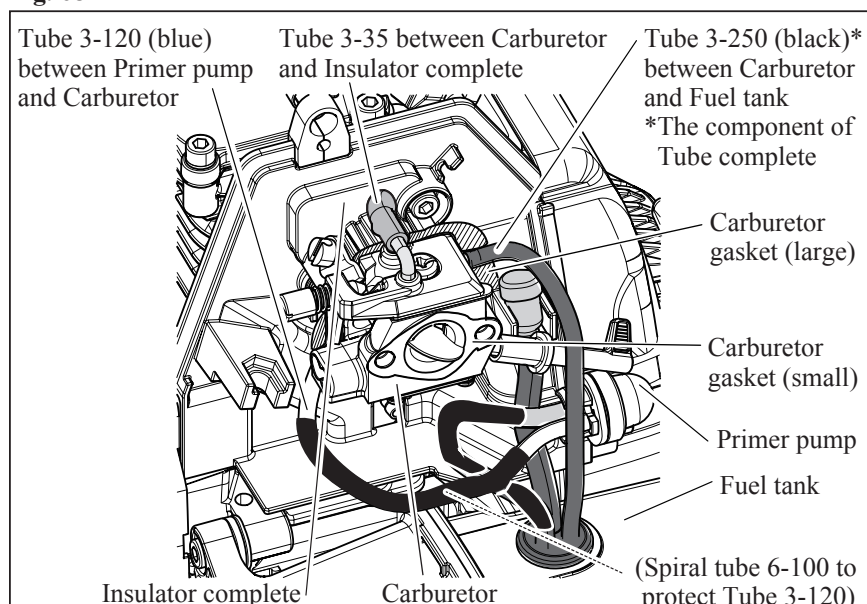


Fig. 69

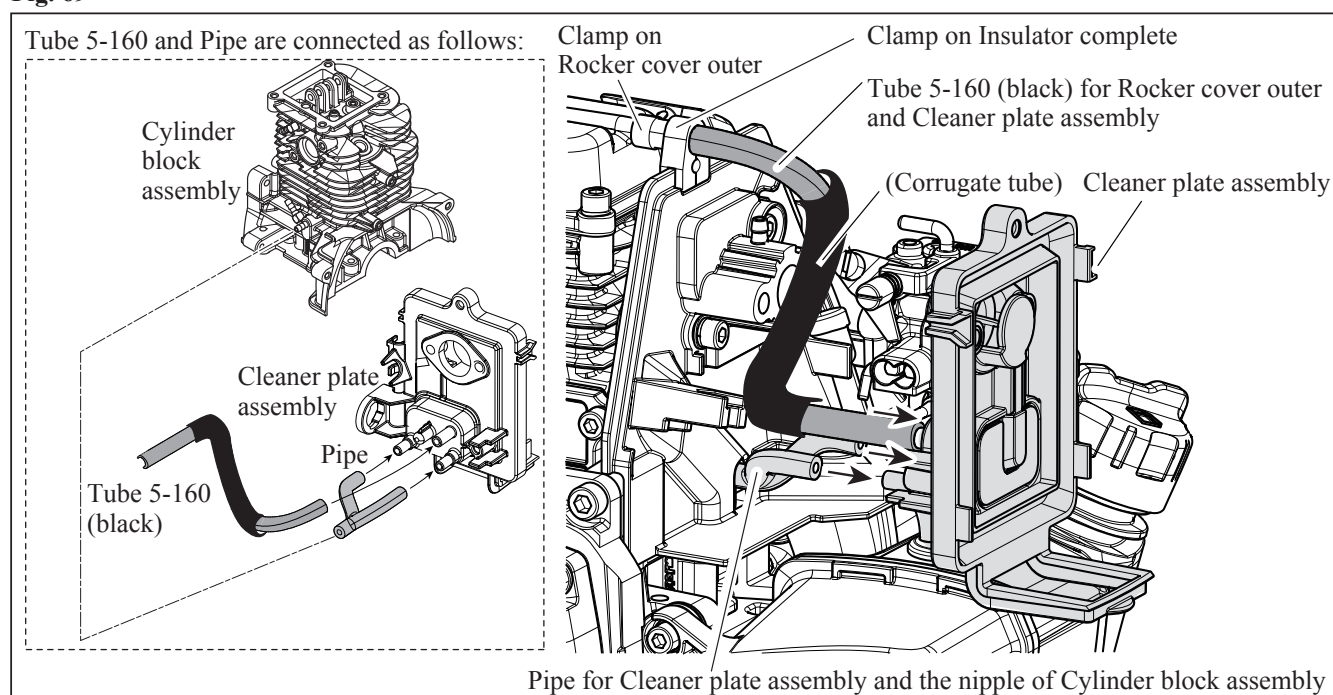
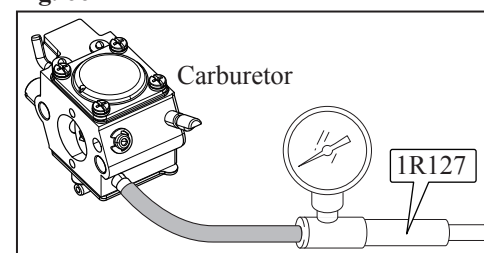


Fig. 66



## Repair

### [4] DISASSEMBLY/ ASSEMBLY

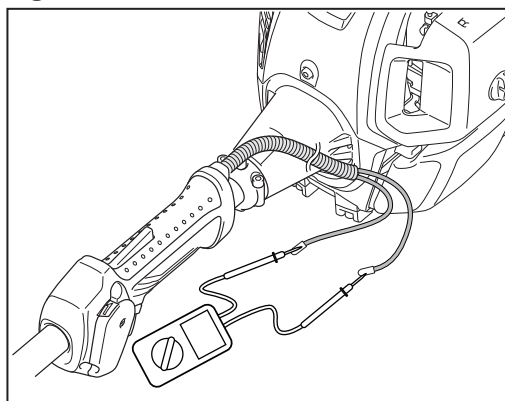
#### [4]-11. Stop switch section

##### CHECKING STOP SWITCH

Check the continuity between the bullet terminals on the two lead wires extending from Control lever with a circuit tester. (Fig. 70)

If Stop switch functions properly, there will be no continuity with the switch ON and there will be continuity with the switch OFF.

Fig. 70



#### [4]-12. Fuel tube section

##### FUEL TUBE ROUTING

Set Tube complete\* in place as shown in Fig. 71.

- Connect Tube 3-260 to Carburetor and Gasoline filter with Hose clamp.
- Connect Tube 3-150 to the long pipe of Primer pump.
- Connect Tube 3-120 to the short pipe of Primer pump.

Also refer to Fig. 72.

(3) Put Coil spring 8 and Clamp on Tube 3-150. (Fig. 71)

(4) Route Tube 3-150 as drawn in Fig. 72.

Route Tube 3-120 between Tube 3-150 and Cleaner plate assembly. (Fig. 73)

Fig. 71

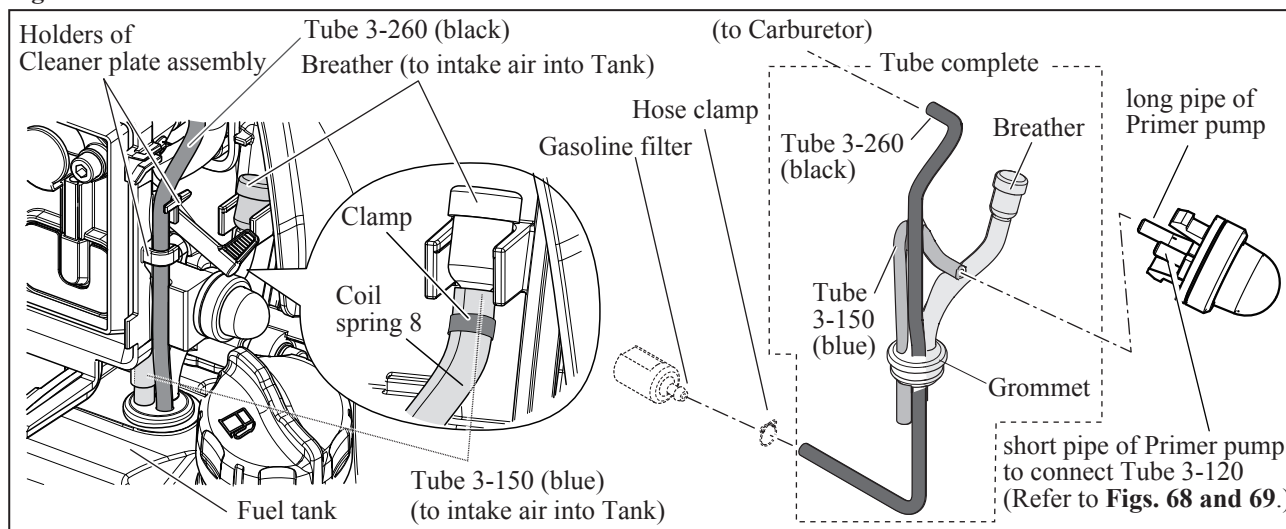


Fig. 72

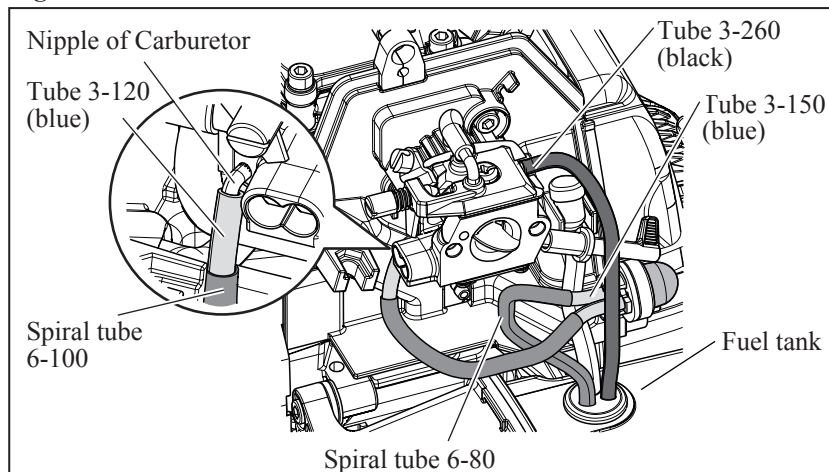
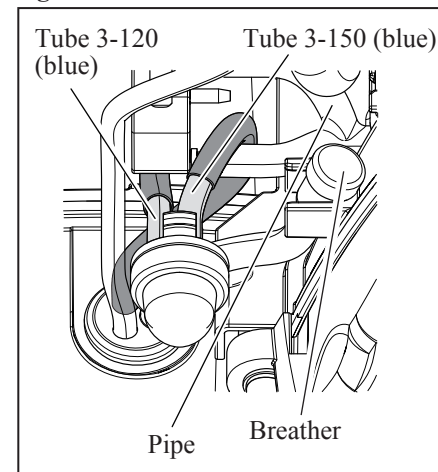


Fig. 73



## ► Repair

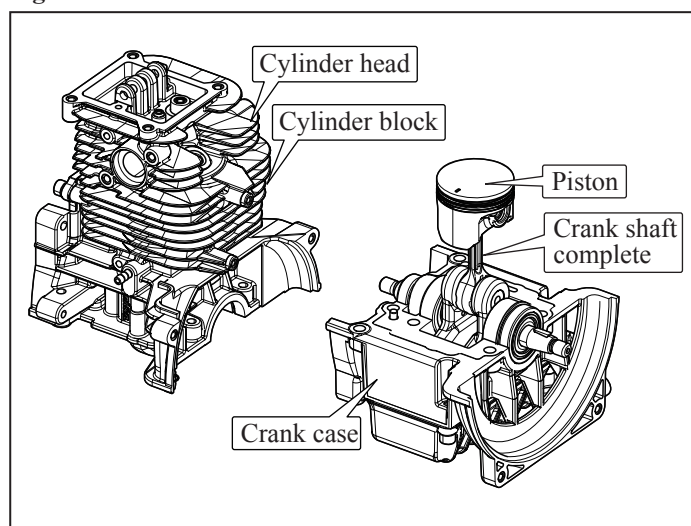
### [4] DISASSEMBLY/ASSEMBLY

#### [4]-13. Engine block

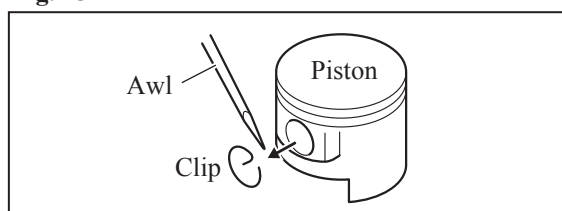
##### DISASSEMBLING

- (1) It is highly recommended to drain the oil system of Engine block before starting disassembling because the oil remaining there will drip out to delay your operation.
- (2) From the engine section, remove the following parts:  
Ignition coil, Flywheel complete, Rocker cover inner, Rocker cover outer, Rocker arm assembly (2 pcs), Rod 2.5 (2 pcs), Cam lifter (2 pcs), Cam gear assembly, Insulator complete, Cleaner plate assembly, Carburetor, Spark plug, Exhaust muffler.
- (3) Remove the assembly of Cylinder head and Cylinder block. (**Fig. 74**)
- (4) Remove Clip (2 pcs. in total) from each end of Piston pin with a pointed tool such as an awl as shown in **Fig. 75**.  
**Note:** • Be careful with Clip because it can pop out unexpectedly during removal operation.  
• Do not use removed Clip. Be sure to replace it with new one.
- (5) Remove Piston pin with 1R171 or the like as shown in **Fig. 76**.
- (6) Remove Piston from Crankshaft complete, then separate Top ring, Second ring and Oil ring from Piston.  
**Note:** Mark on one of Top or Second ring to distinguish the original position for reassembling.

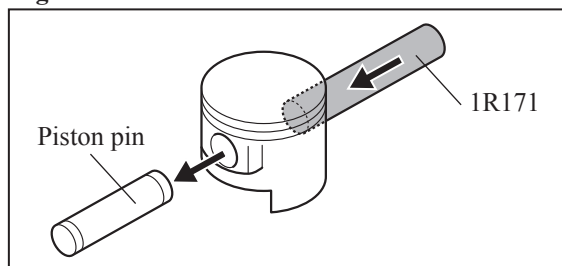
**Fig. 74**



**Fig. 75**



**Fig. 76**



## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-13. Engine block (cont.)

##### ASSEMBLING

- (1) Connect Piston with Crank shaft complete by inserting Piston pin into place; there is no front/back to Piston.

**Note:** Be sure to apply a little amount of Makita grease N No.2 to Needle roller bearing.

- (2) Secure Piston pin by mounting Clip onto each end of Piston pin. Any setting direction is allowed.

- (3) Install Oil ring in the grooves of Piston; Side rail first, Spacer next, then the other Side rail.

**Important:** Be sure to fit the three rings with the ring gaps at 120 degrees to one another as shown in the left of Fig. 77.

- (4) Install Second ring first then Top ring in the groove of Piston.

**Important 1:** Be sure to fit the two rings with the ring gaps at 180 degrees to each other as shown in the right of Fig. 77.

**Important 2:** Second ring has a taper face and must be installed with the large diameter facing Oil ring. (Fig. 78)

**Distinguishing between Top ring and Second ring & Discriminating the larger diameter of Second ring:**

If both of the two rings are new and unused,

- You can distinguish from their appearances; there is a T marking on the right upper end of Second ring as shown in Fig. 75 while not on the upper end of Top ring.
- You can face the large diameter of Second ring by placing Second ring with the T marking on your right and with the ring gap near you as shown in Fig. 79.

If both of the two rings are used and the T marking of Second ring is rubbed off, carefully press the side face of the two rings to the inner wall surface of Cylinder. You will be able to distinguish the two rings or to discriminate the large diameter of Second ring through the differences in contact feelings that the different side faces make.

Fig. 77

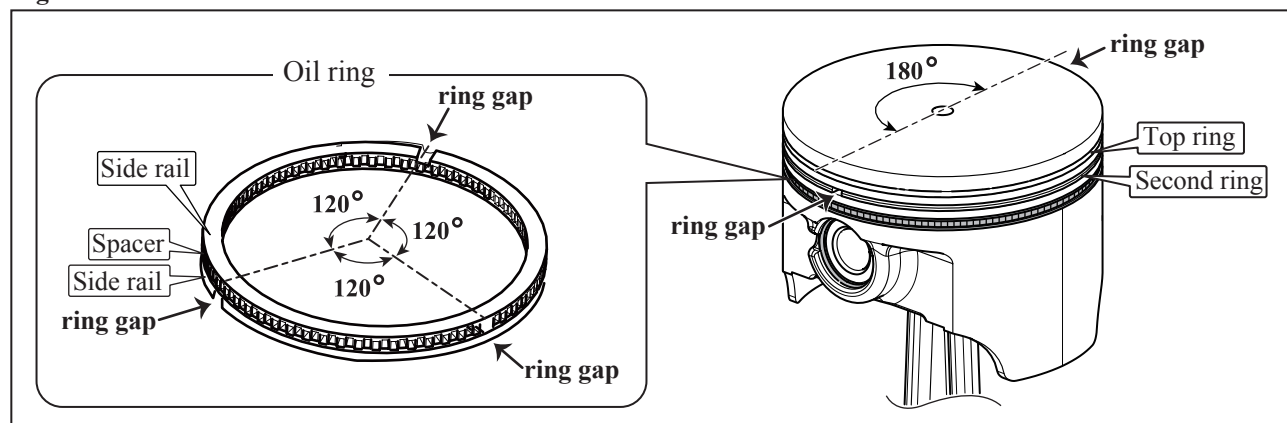


Fig. 78

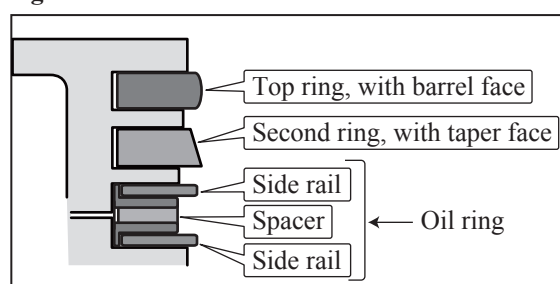
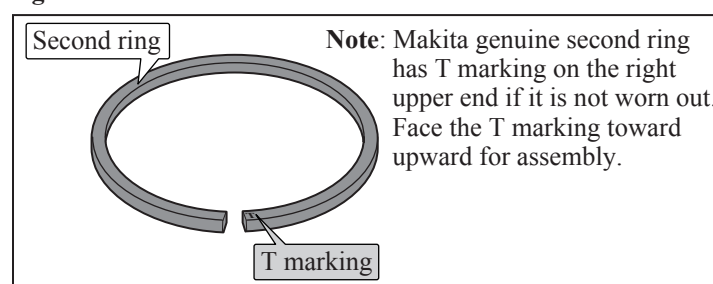


Fig. 79



- (5) Apply 4-cycle engine oil to the following portions:  
Oil ring, Needle roller bearing that holds Piston pin,  
Needle roller bearing of Crank shaft complete.

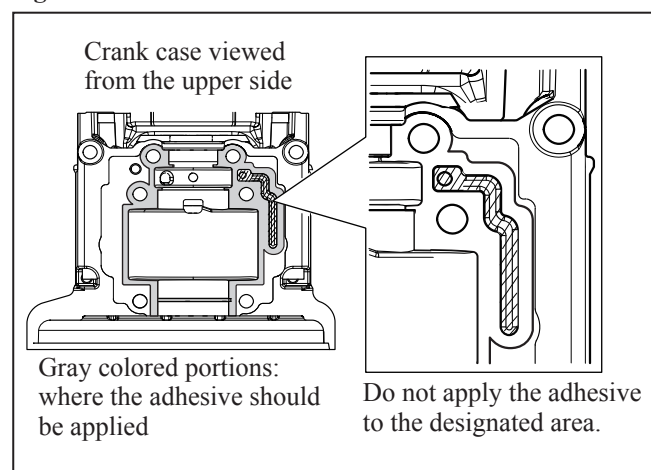
- (6) Remove oil/grease from the mating surface of Cylinder block and Crank case.  
Then apply ThreeBond 1215/ 1216 carefully to the mating surface of Crank case as shown in Fig. 80.

**Note:** Do not apply the adhesive to the area designated by the enlarged view.

Apply 4-cycle engine oil to the sliding surface of Piston section and Cylinder block assembly, and then while compressing Piston rings, mount Cylinder block onto Crank case.

- (7) Tighten eight M6x25 Hex socket head bolts in a crisscross pattern.

Fig. 80





## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-13. Engine block (cont.)

##### DISASSEMBLING

(8) Adjust Valve clearance as follows:

1. Align the marks on the following parts:

- Ignition coil and Flywheel complete (**Fig. 81**)
- Cam gear assembly and Cylinder block (**Fig. 82**)

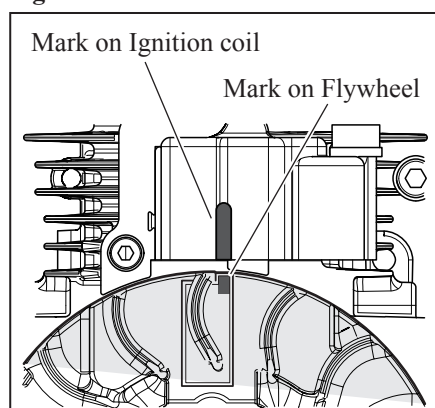
2. Set two Cam lifters and two Rods 2.5 in place, then assemble two Rocker arm assemblies to them.

**Note:** The ends of two Rods 2.5 have to be fit into the holes on Rocker arm assemblies and Cam lifters. (**Fig. 83**)

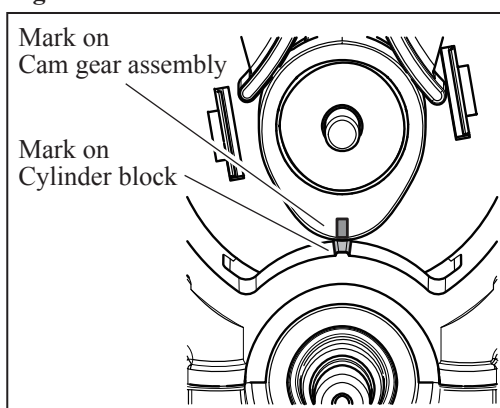
3. Assemble Cam gear cover gasket and Cam gear cover to Cylinder block assembly by tightening four M5x16 Hex socket head bolts firmly.

4. Revolve Flywheel assembly two turns clockwise (**Fig. 84**) and align the marks on Flywheel complete and Ignition coil to move Piston to the upper dead point. (**Fig. 81**)

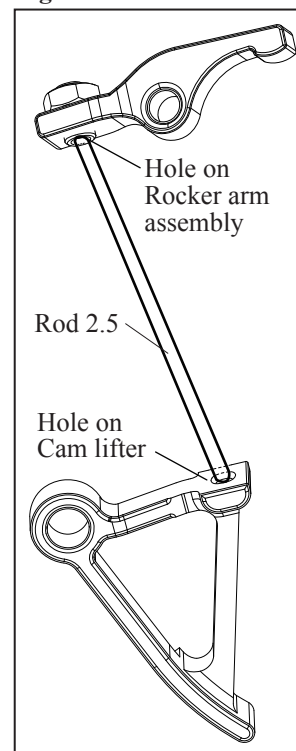
**Fig. 81**



**Fig. 82**



**Fig. 83**



5. Tighten Hex nuts of Rocker arm assemblies, then loosen Adjusting screws of Rocker arm assembly.

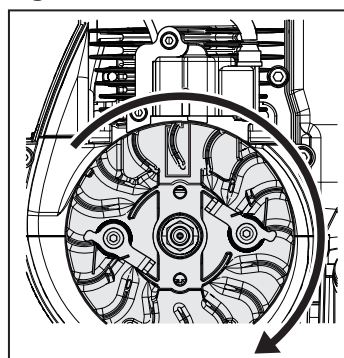
Insert 0.08mm thick leaf of 1R366 into the clearance between Rocker arm and Valve section (Re: **Fig. 85**), then adjust the valve clearance.

6. After checking the feeler gauge can be passed through the clearance and the clearance itself is not more than 0.12mm, tighten Hex nuts of Rocker arm assembly securely, and then remove the gauge from the clearance.

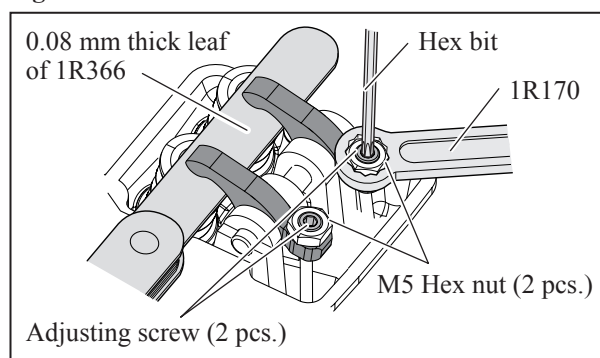
**Note:** While making two Rocker arms close to the center (**Fig. 86**), adjust the valve clearance with Hex nuts pushing down by hand slightly (**Fig. 87**) and check the valve clearance.

After setting Spark plug in place and turning Flywheel left and right to 45° two or three times (**Fig. 88**), retry checking of the valve clearance.

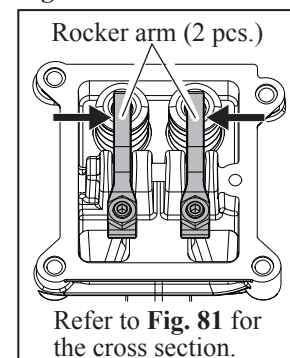
**Fig. 84**



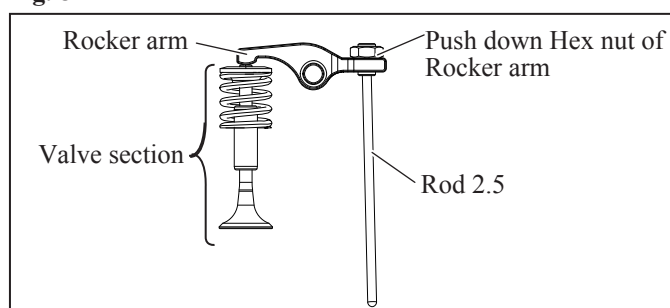
**Fig. 85**



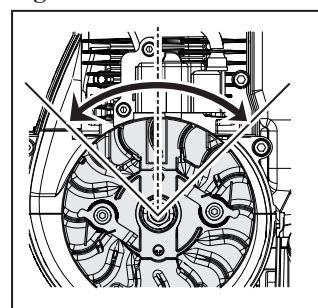
**Fig. 86**



**Fig. 87**



**Fig. 88**





## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-13. Engine block (cont.)

##### ASSEMBLING

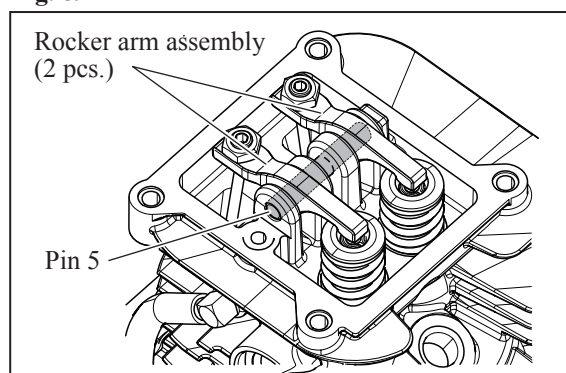
Assemble by reversing the disassembly procedure.

#### [4]-14. Valve section

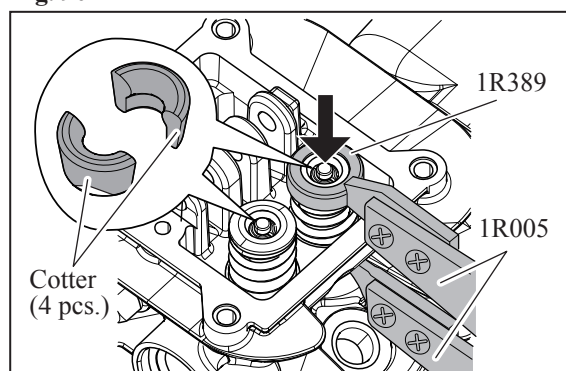
##### DISASSEMBLING

- (1) Remove two Rocker arm assemblies and Pin 5 from Cylinder block assembly. (**Fig. 89**)
- (2) Push a rag into Cylinder block assembly from the bottom side so as not to fall off Intake valve and Exhaust valve.  
The rag works as protection of the inside of Cylinder block assembly.
- (3) Remove Cotters, Retainers and Compression springs 11 from Intake valve and Exhaust valve with 1R389 and 1R005. (**Figs. 90 and 91**)

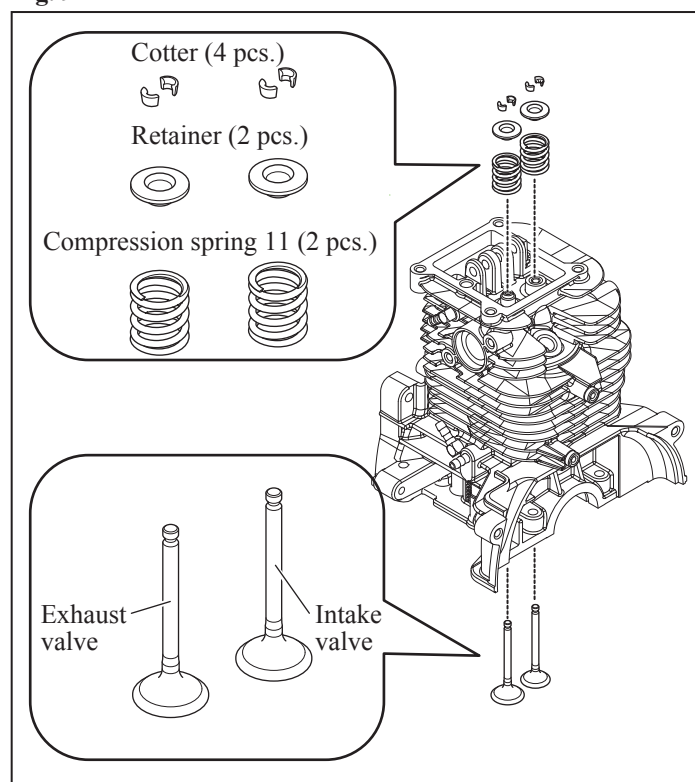
**Fig. 89**



**Fig. 90**



**Fig. 91**



## ► Repair

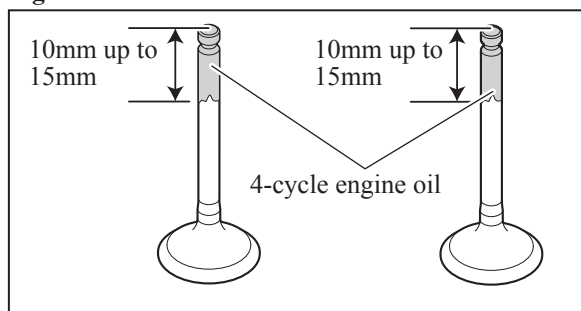
### [4] DISASSEMBLY/ASSEMBLY

#### [4]-14. Valve section (cont.)

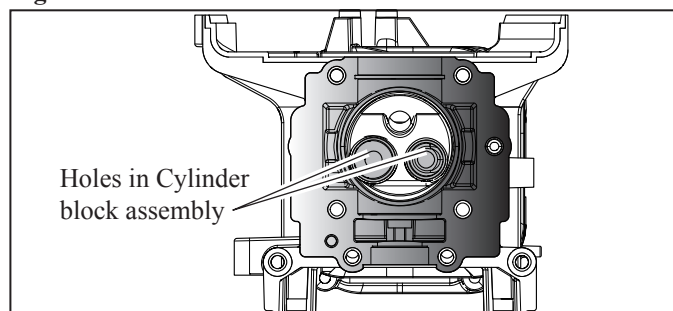
##### ASSEMBLING

- (1) Apply 0.05cc of 4-cycle engine oil to Exhaust valve and Intake valve as drawn in **Fig. 92**, then insert them into the holes in Cylinder block assembly. (**Fig. 93**)
  - (2) Push a rag into Cylinder block assembly so as not to fall off Intake valve and Exhaust valve.
  - (3) Assemble Retainers, Cotters and Compression spring 11 to Cylinder block assembly as drawn in **Figs. 91 and 90**, then while pushing Compression springs 11, pass the valve tops through the holes of Retainers, (**Figs. 94 and 95**) Then assemble Retainers, cotters and valves each other.
- Note:** If it is difficult to assemble them, use 1R389 with 1R005.
- (4) Set Pin 5 and two Rocker arm assemblies in place of Cylinder block assembly. (**Fig. 89**)

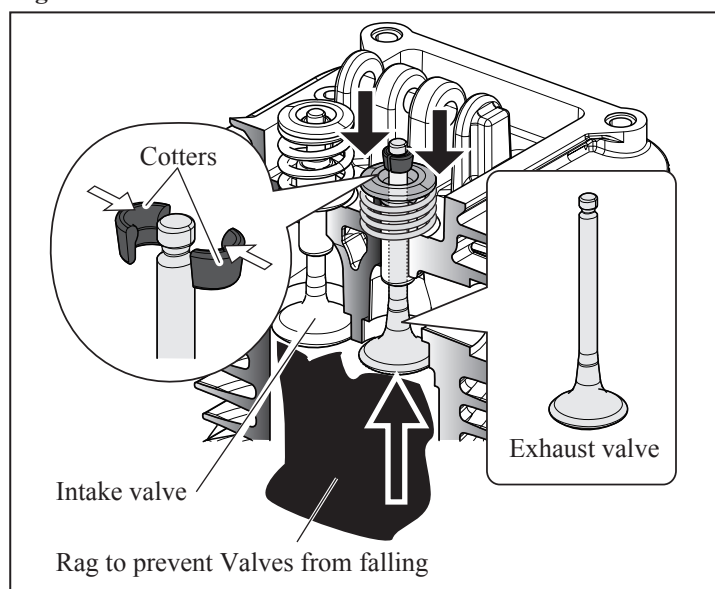
**Fig. 92**



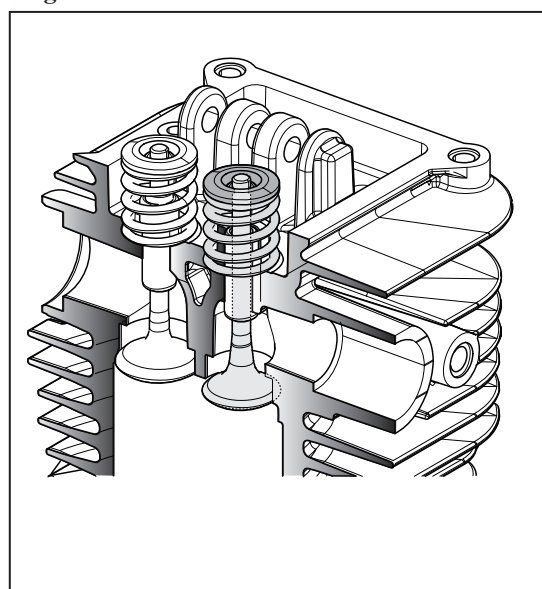
**Fig. 93**



**Fig. 94**



**Fig. 95**



## ► Repair

### [4] DISASSEMBLY/ASSEMBLY

#### [4]-15. Tightening torque specifications

Application (for fastening A and B)		Fastener	Tightening torque (N.m)
A	B		
Cylinder block	Crank case	M6x25 Hex socket head bolt (8 pcs.)	11.0
Crank case	Retainer plate	M5x18 Hex socket head bolt	6.0
Crank case	Oil case	M5x18 Hex socket head bolt (4 pcs.)	6.0
Flywheel	Crank shaft	M8 Collared hex nut	16.0
Flywheel	Ratchet	M5x12 Hex socket button head bolt (2 pcs.)	4.0
Ignition coil	Cylinder block	M4x20 Hex socket head bolt (2 pcs.)	4.0
Cam gear cover		M5x16 Hex socket head bolt	6.0
Rocker arm adjusting screw	M5 Hex nut	M5 Hex nut (2 pcs.)	6.0
Rocker cover outer	Cylinder block	M5x18 Hex socket head bolt (4 pcs.)	6.0
Clutch base	Crank case	M8 Hex portion of Clutch base	16.0
Clutch shoe	Clutch base	M8 Shoulder hex bolt (2 pcs.)	10.0
Muffler	Cylinder block	M6x20 Hex socket head bolt	11.0
Engine base	Cylinder block, Crank case	M6x20 Hex socket head bolt (4 pcs.)	11.0
Spark plug	Cylinder block	Spark plug (M10-pitch 1.0)	12.0
Insulator complete	Cylinder block	M5x20 Hex socket head bolt (2 pcs.)	6.0
Starter cover assembly		M5x20 Hex socket head bolt (4 pcs.)	5.0
Muffler plate	Crank case	M5x18 Hex socket head bolt (3 pcs.)	5.0
Oil pipe	Oil case	M5x18 Hex socket head bolt	5.0
Cleaner plate assembly	Insulator	M5x60 Hex socket head bolt	4.0
Cleaner cover assembly	Cleaner plate assembly	M5x20 Hex socket head bolt	0.5
Cylinder cover	Engine base	M5x20 Hex socket head bolt (4 pcs.)	2.5
Cylinder cover	Starter cover assembly	M5x20 Hex socket head bolt	2.5
Gear case assembly	Shaft pipe complete	M5x14 Hex socket head bolt (2 pcs.)	5.0
		M6x30 Hex socket head bolt	13.0
Control cable	Insulator	M6 Nut	1.5
Pipe bracket	Shaft pipe complete	M5x18 Hex socket head bolt	5.0
	Cleaner plate	M6x30 Hex socket head bolt	9.0

#### EM4351UH

Housing holder	Shaft pipe complete	M5x18 Hex socket head bolt	5.0
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#### EM4350UH

Pipe clamp	Pipe holder	M6x25Hex socket head bolt	6.0
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#### EM4350LH

Control lever assembly	Shaft pipe complete	M5x14 Hex socket head bolt	2.5
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